RMR
Research Management Review

The Journal of the National Council of University Research Administrators

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EDITOR’S PREFACE

Developing research capacity, sustaining it, and bringing the benefits of research to society, and the increasing challenges these endeavors place on those engaged in the research enterprise—from undergraduates, post-docs and faculty, to research administrators and their institutions of higher education—is a common thread among the papers in this issue of the Research Management Review.

The case study by Donna Sandfort describes the impacts of equalizing the benefits packages provided to post-doctoral investigators at Princeton University, to address the disparity between those supported by fellowships and those supported by sponsored project funding.

Robert Porter provides guidance for investigators on the need for and ways in which to engage sponsored program officers as part of the proposal development process, and includes some very specific examples for proceeding in developing a relationship that could result in winning funding.

The results of a survey of U.S. technology transfer offices (TTOs) conducted by Irene Abrams, Grace Leung, and Ashley Stevens show that, on average, TTOs do not generate sufficient funds to cover the operating costs of their programs, so that universities are faced with using other resources to invest in their TTOs in order to bring the benefits of their research to society.

The contribution from Laura Ryser and Greg Halseth focuses on building student research capacity in Canadian institutions of higher education and explores the challenges and opportunities investigators face in engaging students in research, in an environment that increasingly supports multi-investigator, collaborative research.

The last paper, by Cynthia Carr, Joseph McNicholas, and Robert Miller, explores faculty attitudes toward research and scholarly and creative activity at a predominantly undergraduate institution where teaching is the primary focus.

PAMELA PLOTKIN, PH.D.
CORNELL UNIVERSITY
EDITOR
NOVEMBER 2010
The Positive Impact of Benefit Changes for Postdoctoral Researchers at Princeton University: A Case Study

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Princeton Neuroscience Institute
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ABSTRACT

Postdoctoral researchers are most commonly supported by sponsored research projects, institutional funding, external fellowship funds, or training grants. Although it is likely that those supported by any of these sources have similar levels of professional responsibility, in actuality the benefits packages for postdoctoral researchers on fellowships and training grants differ from those received by postdocs receiving support through sponsored project funding.

For many years, Princeton University has recognized that the loss of benefits associated with the award of an external postdoctoral fellowship is unfair and serves to discourage postdoctoral researchers from pursuing these awards. However, it also has been recognized that individual fellowships encourage independence early in postdoctoral researchers’ careers and permit them to pursue their research and training goals, and therefore should be encouraged.

This paper contains a description of the steps taken by Princeton University to equalize the benefits packages provided to all postdoctoral fellows, regardless of their type of support. By offering comparable benefits, Princeton is able to continue to attract the highest level of postdoctoral researchers while supporting their training mission as well as their participation in sponsored research.
Postdoctoral researchers surveyed at Princeton were satisfied with the improvement and felt that Princeton’s plan came very close to equalizing the benefits between those on fellowships or training grants and those supported via sponsored project funds. Of those surveyed, 58% reported that the wage supplement from the University (equal to 10% of their fellowship stipend) is equal to or greater than the value of the 9.3% retirement contribution made by the university on behalf of employees. A total of 62.5% of the postdocs surveyed reported that the improvement in the benefit package currently made available to those receiving external fellowships would positively impact their decision to come to Princeton as opposed to another comparable institution that did not offer an equitable benefit package to postdocs receiving external fellowships.

Postdoctoral researchers are most commonly supported by sponsored research projects, institutional funding, external fellowship funds, or training grants. Although it is likely that those supported by any of these sources have similar levels of professional responsibility, in actuality the benefits packages for postdoctoral researchers on fellowships and training grants differ from those received by postdocs receiving support through sponsored project funding.

Sponsoring agencies offer fellowships and training grants in order to advance the education or training of fellows. Recipients receive predetermined stipends intended to provide a living allowance—the cost of benefits is not covered by the fellowship. In most cases federal, state, and local taxes are not withheld.

Unlike fellowships and training grants, sponsored research funding is awarded to an institution based on a project budget. It is intended to cover the costs of the project and provides salary and benefits for the postdoctoral researcher in support of that effort. The postdoc has an employer-employee relationship with the institution.

Within the two major funding agencies, the National Science Foundation (NSF) and the National Institutes of Health (NIH), and across all disciplines, most postdoctoral researchers are supported by research grants (National Academy of Sciences, 2000).

Motivated by limited funding sources as well as the prestige that accompanies external fellowships, faculty advisors encourage postdoctoral researchers to pursue external fellowships. The receipt of fellowships encourages independence early in postdocs’ careers and permits them to pursue their research and training goals. Often a postdoc supported by a competitive individual fellowship has more initial flexibility in choosing a program (National Academy of Sciences, 2000).

Although successfully obtaining external funding is advantageous and often a necessary step in a postdoctoral researcher’s professional advancement, it generally results in a change in rank that causes him or her to be ineligible to receive the same status and benefits enjoyed by institutional employees. In a sense, those who successfully obtain their own external funding are in actuality being penalized for this very accomplishment. The impact is especially severe at Princeton University, where postdocs supported by project grants are eligible for the full suite of employee benefits, including the standard retirement plans. According to a national survey of postdoctoral researchers’ working conditions, most respondents receive satisfactory medical coverage, but the majority do not receive dental, vision, retirement, disability, or life insurance (Nally, 2002). In a survey of institutions, more than one-third reported that the type of medical benefit available is dependent on the source of the postdoc’s funding (National Academy of Sciences, 2000).
In another survey, the National Postdoctoral Association polled 21 institutions (National Postdoctoral Association, n.d.) about benefits offered to postdoctoral researchers in the sciences. In this instance, externally funded fellows are classified as trainees while those funded and paid through their institution are classified as employees. Table 1 illustrates the favorable benefits available to postdoctoral researchers classified as employees. Although the results indicate that a greater number of institutions are providing favorable benefits to externally funded fellows with respect to several select benefits (maternity leave, child care), fewer institutions are providing comparable health insurance benefits, retirement benefits, equal time off, or equitable training allowance to externally funded fellows.

Table 1. Prevalence of Benefits Provided to Postdoctoral Basic Science Fellows

<table>
<thead>
<tr>
<th>Benefit</th>
<th>All</th>
<th>Classified as Trainees (a)</th>
<th>Classified as Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health insurance</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Same health insurance benefits provided to other non-supervisory employees in the organization</td>
<td>90%</td>
<td>88%</td>
<td>92%</td>
</tr>
<tr>
<td>Eligible for the same paid time off benefits provided to other non-supervisory employees in the organization</td>
<td>60%</td>
<td>38%</td>
<td>75%</td>
</tr>
<tr>
<td>Contribute to a retirement plan</td>
<td>67%</td>
<td>56%</td>
<td>75%</td>
</tr>
<tr>
<td>Training allowance</td>
<td>40%</td>
<td>38%</td>
<td>42%</td>
</tr>
<tr>
<td>Maximum training allowance amount per fellow, per year</td>
<td>Avg. = $1,175 (b)</td>
<td>Avg. = $705 (c)</td>
<td>Avg. = $1,600 (d)</td>
</tr>
<tr>
<td>Paid maternity leave, other than accumulated sick and/or vacation time</td>
<td>42%</td>
<td>63%</td>
<td>27%</td>
</tr>
<tr>
<td>Subsidization for child care costs</td>
<td>24%</td>
<td>22%</td>
<td>25%</td>
</tr>
<tr>
<td>Average child care subsidy per fellow, per year</td>
<td>isd</td>
<td>isd</td>
<td>isd</td>
</tr>
<tr>
<td>On-site child care facility available</td>
<td>38%</td>
<td>56%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Notes: isd = insufficient data
(a) The benefits statistics reported for “trainees” include only fellows who are classified as “trainees” for employment purposes and are also eligible for benefits based on funding source
(b) 50% of organizations providing a training allowance report there is no maximum amount
(c) 33% of organizations providing a training allowance report there is no maximum amount
(d) 60% of organizations providing a training allowance report there is no maximum amount

The inequities that arise from this differential treatment are especially pronounced in the sciences, where traineeships are most common. For example, in the life sciences, the NIH supports about 7,000 postdocs via NRSA traineeships and about 6,500 through research grants (National Academy of Sciences, 2000). Through the years, postdoctoral fellows as well as their faculty mentors and sponsoring departments have expressed concerns about the inequalities.

Princeton University, along with other colleges and universities, has been concerned for many years about this paradoxical problem facing postdoctoral fellows receiving external funding.
Committed to continuing to attract the highest level of postdoctoral researchers and supporting their training as well as their participation in sponsored research, the university examined the possibility of eliminating the disparity by treating all non-visiting postdoctoral researchers as employees.

Early in AY2005–2006, the Princeton University Research Board (URB) formed a committee charged with developing a solution that would provide more equitable benefits to postdoctoral researchers supported by training grants and external fellowships within the constraints imposed by the funding agencies. The committee’s proposal received the support of the President, the Provost, the Office of the General Counsel, and the Dean of the Faculty.

In September 2006 the Dean of the Faculty announced changes to the existing postdoctoral ranks. The rank of Visiting Research Fellow (VRF), which covered all postdocs receiving external fellowships, was replaced with the new Postdoctoral Research Fellow (PDRF) rank with a benefits package closely resembling that received by employees.

Postdoctoral researchers in the new PDRF rank receive a supplement from the university totaling 10% of their fellowship stipend, which they are strongly urged to contribute to the Princeton Group Supplemental Retirement Annuity Plan or an equivalent supplemental retirement account. In addition, PDRFs are now eligible for nearly all of the same benefits afforded to employees, including health care, vision care, dental care, basic life insurance, supplemental life insurance, educational assistance, faculty and staff assistance and work/life programs, and long-term care. Postdoctoral researchers surveyed at Princeton reported that after the health care plan, the vision care plan, dental care plan, wage supplement, and work/life programs were the most important benefits available to them.

According to the aforementioned survey, Princeton postdocs were satisfied with the improvement and felt that Princeton’s plan came very close to equalizing the benefits between those on fellowships or training grants and those supported via sponsored project funds. Of those surveyed, 58% reported that the 10% wage supplement from the University is equal to or greater than the value of the 9.3% retirement contribution made by the university on behalf of employees. A total of 62.5% of the postdocs surveyed reported that the improvement in the benefit package currently made available to those receiving external fellowships would positively impact their decision to come to Princeton as opposed to another comparable institution that did not offer an equitable benefit package to postdocs receiving external fellowships.

As was the case before the enhanced benefits were introduced, some exceptions exist for J-1 Visa holders. Postdoctoral researchers from other institutions spending brief periods working on the Princeton campus or those supported by grants sponsored and/or administered by other institutions are appointed as Visiting Postdoctoral Research Associates (VPDRA) and are not eligible for the Princeton benefits package (Princeton University, 2006).

Princeton is neither the first nor the only institution to acknowledge this type of inequality by instituting a policy change to provide parity in benefits between postdoctoral researchers receiving external funding and those supported by sponsored research or institutional funding. For example, in July 2003, postdoctoral fellows at the Harvard Graduate School of Education receiving external fellowships in the form of a stipend through Harvard’s payroll became eligible for a more equitable employee benefit package (S. Liberman, personal communication, April 23, 2007). In January 2004, the University of Chicago, Biological Sciences Division (BSD) and
Physical Sciences Division (PSD), began to provide a supplement to assist in the purchase of health coverage and other optional coverages, including dental, life, and long-term disability coverage not otherwise provided to recipients of external fellowships (M. Gonzalez, personal communication, April 12, 2007).

The changes that Princeton has instituted reflect its belief that equalizing benefits among all postdoctoral researchers is advantageous not only to postdocs, but also to their faculty advisors and to the institution. The belief that all postdocs are created equal permits the institution to attract, retain and develop the most talented and promising individuals.

LITERATURE CITED


Can We Talk?
Contacting Grant Program Officers

Robert Porter
University of Tennessee

ABSTRACT
For success in grantseeking, solid writing skills are necessary but not sufficient. In addition to compositional excellence, researchers must master the relational demands of external funding. Chief among these is the need to establish an effective line of communication with an appropriate grant program officer in the funding agency. This paper presents the rationale for initiating contact with a program officer and describes a sequential set of activities designed to assure a productive dialogue. It concludes with a sample coaching script research administrators can use to assist investigators in this critical process. The time taken to do this, prior to writing the proposal, will be the best possible investment new researchers can make in the grantseeking aspect of their academic careers.

INTRODUCTION
“A sound concept, but it does not fit our current funding priorities.” Each year, disappointed grant writers will read comments like this on the reviews that accompany notices of proposal rejection. Successful grant writers know that early contact with a program officer before deciding to write a proposal is key to avoiding this distressing outcome (Porter, 2005). Preproposal communications can have a powerful impact on the researcher’s thinking, from reshaping the research design to rethinking where the proposal should be submitted, or if it should be written at all. Most grant writing texts mention the importance of early and effective communications with grant officers, but few offer specific advice. The most helpful materials have been published by New and Quick
(1998) and Blackburn (2003). This paper presents an extension of their work, emphasizing the research administrator’s role as coach and mentor to inexperienced investigators.

**BACKGROUND**

This article is based on interviews with sixteen senior researchers at Virginia Tech that were the basis for a 2005 paper published in *The Journal of Research Administration*, “What Do Grant Reviewers Really Want, Anyway?” All had strong track records in sponsored research, served on multiple review panels, and interacted with numerous grant program officers. Further insight has been gained as the author designed and directed an annual Grant Writing Institute at the university, which involved a series of intensive summer sessions over a three-year period from 2006 to 2008 that included a “Day in DC,” where a total of thirty-four faculty members met with program officers at several funding agencies. In debriefing Institute participants after such meetings, the author noted important lessons learned, especially where program officers imparted critical information that was not apparent from their grant programs’ printed materials or the agencies’ web sites.

**SKILL SETS FOR SUCCESS**

Creative scholarly expertise drives sponsored research in all disciplines, and strong grant writing skills are a recognized prerequisite for success. Less widely appreciated is a second skill set—the relational skills needed for positive interactions with a sponsor agency (Figure 1).

![Figure 1. Skill Sets for Success](image)

At the outset, the most important relational skill needed by researchers is the ability to initiate and maintain contact with an appropriate grant program officer, a dialogue that aims to: a) determine whether the researcher’s basic concept is a good fit with the program’s goals and objectives; b) seek advice concerning project design and appropriate funding track; c) ascertain trends in preferred research methodologies; and d) identify possible limits in project duration and budget.

While several senior investigators commented on the importance of relationship-building, one senior researcher with an impressive funding history credited this skill as key to his success:
As a PI or co-PI you need to have a relationship with the program manager. Your job in writing the proposal is to help the program manager be successful. I really believe that. So if the program manager says, “Look, I want to develop the next XYZ,” your job is to help him or her be successful by doing just that. That’s the truth. Your job is to help that manager establish that XYZ program. You do it by showing a 2 or 3 page white paper and asking “How about this, does this fit your program?” It’s very important to strike up a relationship with the program manager in a somewhat personal way. I mean go visit face-to-face first: You don’t want to send a white paper out of the blue, you want to go up to DC and meet these people (T. Long, personal communication, May 20, 2004).

**A QUESTION OF FIT**

Starting to write a proposal without assurance of how well it matches what the sponsor wants to fund is a bad gamble indeed. New and Quick (1998) have estimated that up to 60% of all proposals are eliminated on first reading because the writer had not made an adequate project match or failed to follow directions. Where there is a poor fit, grant writers squander a good deal of their most precious resource—time—developing, revising and polishing documents that have little or no chance for success. Why do many bright people make such a fundamental mistake? The answer could lie in longstanding traditions of academe. From sending off papers to refereed journals to applying for jobs, academics are accustomed to parsing meaning from written materials, expressing their best thinking in written form, and then awaiting the judgment call. Writing or phoning to inquire if the paper will be published or the job will be offered is considered gauche, if not verboten. In the absence of coaching to the contrary, they reflexively apply the same habits to grant funding agencies, not realizing that winners in sponsored research play by different rules altogether.

**TIP OF THE ICEBERG**

Young investigators are prone to plunge into proposal writing based on what they read in the program solicitation. But this information is like the tip of an iceberg. Much of what needs to be known about that program—the critical success factors—is hidden beneath the surface and cannot be gleaned from the most careful study of published information. Following are core findings from interviews with seasoned investigators, as well as numerous meetings with program officers as reported by less experienced researchers in Virginia Tech’s Grant Writing Institute:

1. Published material should be viewed as just the “official line” for the grant program, and may not reflect underlying considerations that determine which proposals are likely to be successful.
2. Program officers and their review panels can develop distinct preferences and dislikes over time; these rarely find their way into print.
3. Program priorities can shift over time, sometimes substantially, while published materials remain unchanged.
4. A PO’s candid, informal response to the proposal’s core theme is the best predictor of success, even though no guarantee is expressed or implied.
5. PO’s can and often do give valuable advice on matters related to program track, budget, collaborations, and project structure.
6. Finally, if the proposed project is not a good fit with the identified program, the PO can often suggest better alternatives.
In short, the unofficial “rules of the game” can separate winners from losers, and these are best learned at the outset. Finally, it is well to remember that the part of the iceberg that sank the Titanic was below the water.

**WHY PROGRAM OFFICERS WELCOME INQUIRIES**

For investigators who are new to sponsored research, the prospect of initiating contact with an official in a funding agency can be daunting. How will I be received? Is it really legitimate to discuss my project before I’ve submitted a proposal? Can I be specific enough to be credible? Unanswered, questions like these can freeze a young investigator’s initial apprehension into a state of permanent inaction, needlessly. In fact, most program officers welcome such contacts for a variety of reasons.

First and foremost, as Blackburn noted, talking to researchers is one of the most important responsibilities assigned to PO’s, especially by the federal agencies, so we should help them do their jobs. They are supposed to give away money, not hold on to it. Also, it is well to keep in mind that most PO’s are former academics; many were successful in their research careers prior to joining the agency, and they enjoy opportunities to reconnect with their academic counterparts. For a deskbound bureaucrat, talking over fresh ideas is a pleasant way to keep up with the field and track future directions. Two other motives have a more practical bent: First, if the core idea is not likely to be funded, the PO can reduce the office workload by discouraging the submission. Conversely, if the PO finds the idea intriguing, s/he might provide helpful hints on how to shape the proposal in ways that will result in a more positive review. Finally, key federal agencies—the National Science Foundation, National Institutes of Health, Department of Energy, National Endowment for the Humanities—engage grant reviewers by the tens of thousands each year and are constantly on the lookout for fresh talent. A young investigator should never hesitate to express a desire to serve on a review panel; it will be a graduate education in grant writing (Member, 2003, Porter, 2005).

**A SAMPLE COACHING SCRIPT FOR THE RESEARCH ADMINISTRATOR**

Apprehensive young investigators will benefit from coaching on how to arrange a successful encounter with a program officer. The following is a sample coaching script for the research administrator, written as advice to the researcher:

1. **Identify the grant program(s)** whose objectives most closely match the core themes of your proposed research. Study the mission statement of the program office and parse any relevant program solicitation. Be prepared to modify your ideas somewhat to assure a good fit, as long as you stay within your proven expertise. Look up recent awards to see how your work will make a contribution or fill a gap. From the staff directory, identify an officer who has responsibility for that program.

2. **Write a brief pre-abstract** summarizing your proposed project. Using accessible language with a minimum of specialized terminology, describe your project in concise, concrete terms. List your main objective(s), methods, and expected outcomes. Stress the project’s uniqueness and how the outcome(s) will address an important problem or contribute to the field. The PO does not need much detail to give you an initial reading, so do not write more than half a page. Rehearse it until you can recite it easily and without hesitation. Think of this as an “elevator speech,” as it helps to
envision a personal, time-limited encounter with a PO. A sample pre-abstract is included here as Appendix A.

3. Start with an e-mail. In your pre-abstract, indicate why you think your project will achieve the grant program’s objectives. End by asking if your work is the kind the program might consider funding. You should get a response within a day or two—study it for tone and nuance as well as its direct message. You might get a recommendation to contact a completely different program office. There might be hints about how to strengthen your proposal. Some PO’s will ask to see a longer description of your project—usually a positive sign. If there is encouragement of any kind, go to the next step.

4. Make the call. Once there has been an exchange of e-mails, you have a relatively easy way to begin the conversation. Describe your project again, and then say you would like to discuss some issues the PO raised in the e-mail. If it is a federal agency and you happen to be within reasonable travel distance to Washington, ask if you could meet within the next couple of weeks. One way is to suggest that you are planning a trip to the DC area and it would be convenient to stop by. If the PO agrees to a meeting (and many will), you should expand your pre-abstract into a short (1–2 pages) white paper and send it first. For researchers applying to the National Science Foundation, the Office of Proposal Development at Texas A&M University has published a particularly helpful guide to preparing for a face-to-face meeting (Nader, 2009).

5. Take advantage of professional meetings. In addition to contacting PO’s in their offices, researchers in most disciplines have opportunities to interact with program officers at regularly scheduled academic and scientific conferences. PO’s attend these events to keep abreast with current and emerging developments in their fields, and often to present topics of their own.

Additionally, NSF and NIH hold regional grants conferences at locations around the country (National Science Foundation, 2010a; National Institutes of Health, 2010). Attended by numerous program officers, these events are specifically designed to update researchers and research administrators on agency policies, changes in the grant application and review processes, as well as developments in funding priorities. Of special interest to less experienced researchers are the NSF Days, hosted several times a year by sponsoring colleges and universities (National Science Foundation, 2010b). As members of National Council of University Research Administrators and the Society of Research Administrators know, their national and regional meetings typically feature presentations by program officers from several federal agencies.

6. Conducting a successful conversation. Whether by phone or in person, remember you are using this as an opportunity to obtain “between the lines” information to decide: a) whether to write a proposal for this program; and b) how to shape it in such a way to get a favorable review. In the course of the conversation, seek answers to the following:

Does my project fall within your current priorities?
If it does not, explore different objectives that might yield a better fit or ask for suggestions of other programs that might be interested in your project.

What would you recommend to improve my chances for a favorable review?
Do not be bashful about asking this question—the PO knows this is the main reason for your call!
What is the anticipated proposal success ratio?
Success ratios are your statistical odds for success. Rates are highly variable among grant programs, ranging from 5% to 40%, with most in the 10–20% range. First-time submissions have lower rates; resubmissions are higher.

Do you expect last year’s average award amount to change this year?
This answer should help you determine your project’s budget size.

What are some of the common reasons for proposal rejections?
This will help you understand likes and dislikes of review panels that do not show up in the program’s written materials.

Throughout the discussion, listen carefully for helpful hints about proposal structure and content. Do you hear any “buying signals,” i.e., signs that the PO is intrigued by your idea? Conversely, be on the lookout for hints that the PO does not think you have much of a chance. (Sometimes they hesitate to come right out and say it.)

7. Follow up. A short “thank you” note is more than good manners—it is a way to keep the line of communication open and fresh for both parties, especially if you summarize the key points you heard in the conversation. It is also a good idea to repeat your desire to serve as a reviewer, and attach a one-page CV with your picture on it. Sponsor agencies seek to enhance the diversity of their panels, and some, like the National Science Foundation, will engage young investigators before they write their first proposals. Others, like the National Institutes of Health, typically issue an invitation after the first award is made.

CONCLUSION
Even if they are new to sponsored research, investigators should not hesitate to initiate contact with program officers. PO’s are accustomed to these inquiries, and most will do their best to be helpful. As stressed repeatedly by National Science Foundation officials at a regional grants conference: “Ask early, ask often!” (National Science Foundation, 2007). The time taken to do this will be the best possible investment inexperienced researchers can make in the grantseeking aspect of their careers.

LITERATURE CITED

grant_reviewer_tells_all


APPENDIX A

Sample Pre-abstract

TO: Director, Green Infrastructure Grant Program

I am writing to inquire if our research project is suitable for funding by the Green Infrastructure program. Its title is “Green Infrastructure: Collaborative Networking for Sustainable Water Systems,” and our major goal is to demonstrate how this concept can be implemented at the local and regional levels by forming effective working relationships among academic researchers and community leaders.

While the significant environmental and economic advantages of decentralized water distribution systems are well known, communities in the U.S. have been reluctant to adopt them. We propose to utilize a community capacity-building model to inform community leaders of the long-term advantages of current technologies, while providing educational and technical assistance to encourage their adoption. Our interdisciplinary team includes specialists in the technology of sustainable water systems, environmental design, organizational change, and building community capacity.

Our project outcome will be a model program that showcases the merits of local sustainable water management systems, with a strong potential for national and even global impact. To accomplish this we will: 1) Form a consortium of local governments, regional planning commissions, and state agencies; 2) Develop an electronic manual for planning and implementing decentralized, sustainable water systems; 3) Offer workshops on sustainable systems to target audiences; 4) Develop an interactive web site that will facilitate networking and decision making; and 5) Develop video clips, exhibits and brochures for broader impact. Project assessment will be undertaken by an external evaluator with national experience in this field. Is this project a suitable fit with your program? If so, we would appreciate your advice about how to proceed with proposal development.

Sincerely,

Aqua Vita, Ph.D., Director
Water Resources Research Center
Alpha University
How are U.S. Technology Transfer Offices Tasked and Motivated—Is It All About the Money?

Irene Abrams  
*Brandeis University*

Grace Leung  
*Harvard University*

Ashley J. Stevens  
*Boston University*

**ABSTRACT**

We conducted a survey of directors of offices of technology transfer (TTOs) at U.S. academic institutions to determine how they are organized, tasked, financed, and motivated. We found some interesting quantitative data that have not been reported previously: (1) academic institutions spend on average 0.6% of their research budgets on transferring the technology resulting from their research programs, split 45% on patent protection and 55% on operating costs; and (2) over half the technology transfer programs bring in less money than the costs of operating the program, and only 16% are self-sustaining, bringing in enough income that, after distributions to inventors and for research, there are sufficient funds to cover the operating costs of the program. This leads to the surprising conclusion that the Bayh-Dole Act has been an unfunded mandate on academic institutions, and that academic institutions need to invest in their technology transfer operations in order to bring the benefits of their research to society.
We found that 20.3% of institutions are required to fund 50% or more of their operating budget from the income they generate, giving them an incentive to maximize income. The most important drivers of technology transfer are faculty service and translating the results of research, with only 11.5% reporting revenue maximization as the most important driver. We found that fewer than 20% of offices have incentive compensation plans, and only 28% of the performance factors that are taken into account in determining incentive pay are financial measures, with broader, non-financial performance measures accounting for 70% of the factors. Finally, a surprisingly large number of institutions do not have formal mission statements, but those that do establish broad, non-financial objectives for their offices, with only two institutions out of eighty (2.5%) having mission statements that establish revenue maximization as the objective of the offices.

We therefore conclude that although a small number of academic institutions have reaped very large rewards from their technology transfer activities—close to $4 billion in transactions that we were able to identify—these rewards appear to be a consequence of programs driven by broader objectives, and not a driving force for technology transfer as some have recently asserted. In our assessment, fewer than 10% of U.S. institutions’ technology transfer programs are primarily motivated by financial return.

**BACKGROUND—
TECHNOLOGY TRANSFER IN THE UNITED STATES**

In 1980, Congress enacted the Bayh-Dole Act and allowed U.S. universities, teaching hospitals, and research institutes to have the automatic right to take title to inventions developed with federal funding. In response, these institutions have established offices to seek patent protection on these inventions and license them to existing and new businesses for development and commercialization. Since 1991, the Association of University Technology Managers (AUTM) has published an annual survey that has quantified the magnitude of this enterprise.

The AUTM annual surveys have documented important products that have resulted from Bayh-Dole, and other studies have quantified the considerable contribution to improving public health through the discovery, patenting, licensing, and successful development of approaching 150 small molecule and biological drugs, vaccines, and in vivo diagnostics (Jensen et al., 2007). In addition, key components of the Internet economy—web browsers such as Internet Explorer, portals such as Lycos, email such as Eudora, and search engines such as Google—were based on licensed university technologies.

Certainly some institutions have garnered substantial economic returns from technology transfer. The 2008 AUTM Licensing Activity Survey showed that, overall, U.S. academic institutions received $3.4 billion in licensing income. However, as the survey results also show, this income is highly concentrated in a small number of institutions that have had one big success, most often a drug—the so-called “big hit”. In a relatively recent phenomenon, some of these institutions have accelerated receipt of the future royalty streams from these “big hits” through a sale of their royalty rights to either the marketer of the drug or to specialized investment partnerships and have received even larger, one-time “big hits”. Recent lump sum payments have approached $1 billion. Table 1 summarizes some of these transactions and shows that institutions and their inventors...
have received almost $3.5 billion from such sales since 1999, with the pace accelerating in recent years.

Table 1. Major Royalty Sales by Academic Institutions and/or Their Inventors

<table>
<thead>
<tr>
<th>Date</th>
<th>Product</th>
<th>Licensor</th>
<th>Amount ($ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 1990</td>
<td>Neupogen</td>
<td>Amgen</td>
<td>$75</td>
</tr>
<tr>
<td>Dec. 1999</td>
<td>Zerit</td>
<td>Yale University¹</td>
<td>$125</td>
</tr>
<tr>
<td>Jan. 2001</td>
<td>Thalomid</td>
<td>Children’s Hospital</td>
<td>$5</td>
</tr>
<tr>
<td>Sept. 2003</td>
<td>Aldurazyme</td>
<td>LA Biomed²</td>
<td>$25</td>
</tr>
<tr>
<td>Jan. 2004</td>
<td>Neupogen/Neulasta (U.S.)</td>
<td>Memorial-Sloan Kettering³</td>
<td>$263</td>
</tr>
<tr>
<td>Jan. 2005</td>
<td>Macugen</td>
<td>University of Colorado⁴</td>
<td>$45</td>
</tr>
<tr>
<td>Jan. 2005</td>
<td>Rotarix</td>
<td>Children’s Hospital Cincinnati⁵</td>
<td>n/a **</td>
</tr>
<tr>
<td>July 2005</td>
<td>Emtriva</td>
<td>Emory University⁷</td>
<td>$525</td>
</tr>
<tr>
<td>Aug. 2005</td>
<td>Remicade</td>
<td>NYU/Dr. Vilcek</td>
<td>$46 **</td>
</tr>
<tr>
<td>Aug. 2005</td>
<td>Neupogen/neulasta (Non-U.S.)</td>
<td>Memorial-Sloan Kettering⁸</td>
<td>$142</td>
</tr>
<tr>
<td>Oct. 2005</td>
<td>Humira</td>
<td>Scripps Research Institute⁹</td>
<td>$32 *</td>
</tr>
<tr>
<td>June 2006</td>
<td>Embrel (US)</td>
<td>MGH¹⁰</td>
<td>$248</td>
</tr>
<tr>
<td>April 2007</td>
<td>Enbrel (Foreign)</td>
<td>MGH¹¹</td>
<td>$284</td>
</tr>
<tr>
<td>May 2007</td>
<td>Remicade</td>
<td>New York University¹²</td>
<td>$650</td>
</tr>
<tr>
<td>July 2007</td>
<td>FluMist</td>
<td>U. of Michigan¹³</td>
<td>$35</td>
</tr>
<tr>
<td>Dec. 2007</td>
<td>Lyrica</td>
<td>Northwestern¹⁴</td>
<td>$700</td>
</tr>
<tr>
<td>Dec. 2007</td>
<td>Rotarix</td>
<td>Cincinnati Children’s Hosp.¹⁵</td>
<td>$24</td>
</tr>
<tr>
<td>June 2008</td>
<td>RotaTeq</td>
<td>Children’s Hosp. of Phil.¹⁶</td>
<td>$182</td>
</tr>
</tbody>
</table>

Total $3,451

* Estimate
** Sale by inventor

¹http://chronicle.com/weekly/v48/i06/06a02601.htm
²http://www.paulcapitalhealthcare.com/portfolio/overview.htm
⁵http://www.paulcapitalhealthcare.com/investmentcriteria/inventors/casestudies/cincinnati.htm
⁶http://webreprints.djreprints.com/1578940928144.html
¹¹http://www.boston.com/business/globe/articles/2006/06/06/amgen_to_pay_mass_general_186m/
¹²http://www.royaltypharma.com/media/documents/Remicade-RoyaltyPharmaPurchasedRemicadeRoyaltyFromNYU.pdf
¹⁵http://www.paulcapitalhealthcare.com/newsroom/fundnews/012308.htm
Another source of “big hits” has been sales of equity, such as Dartmouth’s $64 million sale of its equity stake in Medarex in 2000 and Stanford’s sale of its $355 million equity stake in Google in 2005. Yet another has been legal settlements, such as the University of California’s $200 million settlement with Genentech over human growth hormone in 2000 and $30.4 million with Microsoft in 2007 over accessing interactive content on web pages, and the 1999 settlement between the University of Minnesota and Glaxo over Ziaegn, valued at $300 million.

In spite, or perhaps because, of these financial successes, the involvement of academia in commercializing the results of its research has been controversial. Books written on the subject have blamed research commercialization for everything from increasing undergraduate tuition to destroying the public’s trust in the objectivity of the advice and analysis it receives from professors (Bok, 2003; Krimsky, 2003; Washburn, 2005). Others, however, have documented the inherent entrepreneurialism of faculty (Shane, 2004), while others have demonstrated that only a minority of science faculty attempt to commercialize their research (Thursby & Thursby, 2003).

However, there has been little research on why institutions invest in the resources necessary to commercialize the results of their research. When university presidents speak publicly on the issue, they focus more on the public’s right to see a return on the investment of their tax dollars in research grants via the availability of new products and services, rather than on the financial return that they might hope to see. For instance, Dr. Mary Sue Coleman, President of the University of Michigan, told the Annual Meeting of the Association of University Technology Managers in 2005 (Coleman, 2003):

I think many people are often confused about why we are interested in technology commercialization, in nurturing start up companies, and in facilitating more patents and license agreements.

It is not about the promise of future revenues that might be generated from this activity. You heard me correctly. It is not about the money.

Of course, revenue generation serves as an incentive. But first and foremost, technology transfer must serve our core mission: sharing ideas and innovations in the service of society’s well-being.

In fact, at Michigan we expect to re-invest institutional gains back into technology transfer efforts. Revenue generation is NOT the ultimate goal. It is simply the means by which we can increase the transfer of new knowledge into the business sector.

A recent study by Litan, Mitchell, and Eddy of the Kauffman Foundation disputed Dr. Coleman’s views and emphasized the role of financial incentive in technology transfer (Litan, Mitchell, & Reedy, 2007). The Foundation’s website stated:

The emphasis among universities to reap big financial rewards through licensing and patenting innovation developed by research scientists is actually impeding the development of new technologies and may be masking the importance of other means of knowledge transfer.

The study went on to claim that universities are motivated in their technology transfer activities by the prospect of “the big hit”. They stated:
Where this has happened, it is because TTOs have been charged with concentrating too heavily on maximizing revenues from the licensing of university-developed intellectual property, rather than maximizing the volume of innovations brought to the marketplace.

Litan et al. described their research methodology as follows:

We have spent the last several years discussing the role of TTOs with multiple university leaders and researcher-innovators.

As practitioners of technology transfer, Litan et al.’s conclusions did not comport with our experiences. One possible source for the discrepancy is that they appear not to have included in their discussions what is probably the most reliable source of information on what drives academic technology licensing offices—namely the leadership of those offices. While it certainly can be argued that technology transfer offices have a vested interest in preserving the status quo, it cannot be denied that they are a very important source of perspective on the subject, so we decided to carry out a systematic study to ascertain the role of various drivers of behavior in technology transfer decision-making, by surveying the individuals who lead those offices. As will become clear in this paper, Litan et al.’s conclusions do not comport with the findings of our research.

**METHODOLOGY**

We developed a survey instrument and implemented it in the SurveyMonkey system. The questionnaire consisted of 17 questions that were a combination of multiple-choice questions and open-ended questions, some requesting quantitative data, some requesting qualitative information, and some requesting opinions. The questionnaire is available in the appendix.

We sent the survey, via email, to the Association of University Technology Managers’ (AUTM) list of the most senior individual in each member institution who is responsible for technology transfer on a full time basis—the so-called “Director’s List”. The list is compiled from a number of sources:

- Self identification in AUTM’s annual membership renewal process
- Self identification in registration for attendance at AUTM’s annual meeting
- Identification by AUTM from the attendance list for the AUTM annual meeting

We applied to AUTM’s Statistics and Metrics Committee for access to the Director’s List, and our request was approved.

The list AUTM supplied to us was worldwide and contained some 702 entries. We first sorted it by country and then by institution, which yielded 425 entries ostensibly from the U.S. Inspection of the name of the institution or the individual’s email address showed that 17 were in fact non-U.S. institutions and one was a for-profit corporation; for 16 institutions, two individuals were identified as the most senior licensing individual for the same campus at the same institution. In these cases, we selected one of the two by inspecting their respective job titles. This yielded 391 useable email addresses.
We launched the survey, via email invitation, on November 27, 2007. Reminders were sent, via email, on December 4, December 10, and December 12. Fifty-one responses were returned as “Undeliverable” or “I have retired”. Therefore, 340 invitations to participate in the survey were presumably sent and received by the recipient.

A total of 165 usable responses were returned for a 48.5% response rate. Of these, 112 of the respondents replied to every question.

We downloaded the responses, sorted them by institution, and inspected the responses for duplicate responses from the same institution and campus and found none. When we observed obvious errors in the financial responses (for example, thousands instead of millions), we corrected them. In cases in which it was not clear what the respondent meant, we called the respondent to check the figure.

In this paper, we report the responses to every question and the number of responses received for each question. In the sections in which we looked for correlations between different types of performance and behavior, for consistency we analyzed only the 112 complete responses.

**RESULTS**

**Respondents**

**Type of Institution**

The first question asked was whether the respondent was a university, hospital, research institute or other. The results are shown in Table 2. The overwhelming majority of respondents were at universities.

<table>
<thead>
<tr>
<th>Type of Institution</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>University</td>
<td>126</td>
<td>76.4%</td>
</tr>
<tr>
<td>Research Institute</td>
<td>23</td>
<td>13.9%</td>
</tr>
<tr>
<td>Hospital</td>
<td>14</td>
<td>8.5%</td>
</tr>
<tr>
<td>Federal Laboratory</td>
<td>2</td>
<td>1.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>165</td>
<td></td>
</tr>
</tbody>
</table>

We next asked whether the institution was publicly owned or privately owned. The results are shown in Table 3. Publicly owned institutions made up more than 60% of the respondents.

<table>
<thead>
<tr>
<th>Ownership of Institutions</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>63</td>
<td>38.2%</td>
</tr>
<tr>
<td>Public</td>
<td>102</td>
<td>61.8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>165</td>
<td></td>
</tr>
</tbody>
</table>
**Organization of Offices**

We then asked how the TTO was organized—whether it was an operating unit of the institution or an independent corporation such as a research foundation. The results are shown in Table 4. A total of 86% of the offices were organized as units of the institution and only 14% were separate corporations.

<table>
<thead>
<tr>
<th>Organizational Structure</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within Institution</td>
<td>142</td>
<td>86.1%</td>
</tr>
<tr>
<td>Independent corporation</td>
<td>23</td>
<td>13.9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>165</td>
<td></td>
</tr>
</tbody>
</table>

Of the 23 offices organized as independent corporations, all but one were associated with public institutions while one was associated with a private institution. Public universities are governmental entities and so are subject to certain contractual constraints. They frequently find it advantageous to assign ownership of and responsibility for licensing their intellectual property to a research foundation that is an independent 501(c)3 non-profit corporation and is not subject to the legal constraints of a governmental entity.

Finally, we asked how the office reported within the institution—through the academic side of the organization, i.e., ultimately to a Provost, or administratively, i.e., ultimately to a Vice President or Executive Vice President, or to an independent Board. The results are shown in Table 5. Reporting through the administrative side was somewhat more common, with a small proportion reporting directly to the President/Chancellor.

<table>
<thead>
<tr>
<th>Reporting Structure</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic</td>
<td>55</td>
<td>33.7%</td>
</tr>
<tr>
<td>Administrative</td>
<td>81</td>
<td>49.7%</td>
</tr>
<tr>
<td>Independent Board</td>
<td>13</td>
<td>8.0%</td>
</tr>
<tr>
<td>Both/President/Chancellor</td>
<td>9</td>
<td>5.5%</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>3.1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>163</td>
<td></td>
</tr>
</tbody>
</table>

**Volume of Research Support**

We asked the institutions to report the volume of their research. The total reported was $35.7 billion, which is 78.5% of the $45.4 billion in total research support that was indicated on the 2006 AUTM Licensing Activity Survey. This demonstrates that our data are more representative of the totality of U.S. academic licensing activity than the 48.5% overall response rate would indicate. We note, however, that three federal laboratories reported to our survey—federal laboratories do not report to the AUTM Licensing Activity Survey.
Size of Technology Transfer Offices

We asked respondents to report the total employment of their offices, divided between professional staff and support staff. The total reported employment is shown in Table 6.

Table 6. Total Staffing of Reporting Institutions

<table>
<thead>
<tr>
<th>Staff Category</th>
<th>Number of FTEs</th>
<th>Number Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Staff</td>
<td>729</td>
<td>153</td>
</tr>
<tr>
<td>Support Staff</td>
<td>587</td>
<td>134</td>
</tr>
<tr>
<td>Total</td>
<td>1,316</td>
<td></td>
</tr>
</tbody>
</table>

For comparison, respondents to the 2006 AUTM Licensing Activity Survey reported total employment of 1,831.7 FTEs, with support FTEs slightly exceeding professional FTEs. Respondents to our survey therefore employed 71.8% of the employment reported to AUTM, confirming the conclusion of the previous section that our data are more representative of total US technology transfer activity than the overall survey response rate would indicate.

For purposes of subsequent detailed analysis, we assigned size variables to institutions based on both the size of their total research expenditures and the basis of the total size of their technology transfer office. The cohorts and the number in each cohort are shown in Table 7.

Table 7. Cohort Definitions and Populations (Universities Only)

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Research Expenditures ($ million)</th>
<th>Number in Cohort</th>
<th>Total FTEs</th>
<th>Number in Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Small</td>
<td>Up to $50</td>
<td>20</td>
<td>1–3</td>
<td>9</td>
</tr>
<tr>
<td>Small</td>
<td>$51–100</td>
<td>23</td>
<td>4–5</td>
<td>33</td>
</tr>
<tr>
<td>Medium</td>
<td>$101–250</td>
<td>45</td>
<td>6–10</td>
<td>42</td>
</tr>
<tr>
<td>Large</td>
<td>$251–500</td>
<td>24</td>
<td>10–24</td>
<td>36</td>
</tr>
<tr>
<td>Very Large</td>
<td>&gt;$500</td>
<td>39</td>
<td>&gt;25</td>
<td>34</td>
</tr>
</tbody>
</table>

Budgeting Process

The expenses of running a technology transfer office can be broadly divided between patent costs, normally spent externally, and personnel and other operating costs. We next asked respondents to tell us whether they had separate patent and operating budgets or were given a combined budget, implying they had the flexibility to spend their budget between the two categories as they saw fit. The results are shown in Table 8. A total of 60% of institutions had separate patent and operating budgets.

Table 8. Budgeting Procedures

<table>
<thead>
<tr>
<th>Budget Procedure</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separate Patent and Operating Budgets</td>
<td>78</td>
<td>60%</td>
</tr>
<tr>
<td>Combined Patent and Operating Budgets</td>
<td>53</td>
<td>40%</td>
</tr>
<tr>
<td>Total</td>
<td>131</td>
<td></td>
</tr>
</tbody>
</table>
We next asked respondents how big their patent and operating budgets were. The totals for 114 institutions are shown in Table 9.

**Table 9. Technology Transfer Budgets**

<table>
<thead>
<tr>
<th>Budget Category</th>
<th>Amount</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patent Budget</td>
<td>$93,636,000</td>
<td>44.2%</td>
</tr>
<tr>
<td>Operating Budget</td>
<td>112,838,500</td>
<td>53.3%</td>
</tr>
<tr>
<td>Unspecified</td>
<td>5,361,000</td>
<td>2.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$211,835,500</strong></td>
<td></td>
</tr>
</tbody>
</table>

Respondents reported spending roughly 20% more on operations—salaries, travel, services, etc.—than on patent protection. This is the first hard data that we’ve seen of the relative balance between personnel and legal expenditures in U.S. TTOs, though an extensive model developed by Brandt et al. based on staffing levels reported to the AUTM Survey combined with data from a number of surveys of technology transfer salaries (Brandt et al., 2005) came to a similar conclusion.

The 112 institutions that separately reported their operating budgets had total staffing of 925, implying an average operating cost per staff member of $121,988 annually.

For those institutions that reported their operating and patent budgets separately, we calculated the ratio of their patent budget to their operating budget. A ratio of 1:0 would indicate that an institution spent as much on patent protection as on operations. We found an extremely broad spread of values, reflecting an equally disparate spread of operating philosophies. As shown in Table 10, the range ran from a 6.4:1 ratio at one extreme (though this was at an institution with a relatively low overall level of activity—$16k expenditures on patents and $3k on operations. The highest ratio at an institution with a substantial level of activity was 3.5:1—$700k on patents and $200k on operations) to a 0.092:1 ratio (expenditure of $60k on patents and $600k on operations) at the other extreme. The mean was 0.91:1.

**Table 10. Variation in Ratio of Institutional Patent and Operating Budgets**

<table>
<thead>
<tr>
<th>Statistical Measure</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>91.9%</td>
</tr>
<tr>
<td>Median</td>
<td>60.0%</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>94.9%</td>
</tr>
<tr>
<td>Minimum</td>
<td>9.2%</td>
</tr>
<tr>
<td>Maximum</td>
<td>640.0%</td>
</tr>
</tbody>
</table>

Figure 1 shows the distribution of this ratio.
The research budgets of the 116 institutions that reported their technology transfer budgets totaled $26.5 billion, implying that these institutions spend 0.59% of their research budgets on protecting and commercializing the results of that research.

As with the relationship between patent and operating expenditures, there is a considerable variation between institutions in the relationship between technology transfer expenditures and total research expenditures, from a high of 8% to a low of 0.01%. The distribution in this ratio is shown in Figure 2.
Figure 2. Technology Transfer Budget as a Percentage of Research Budget by Institution

**Sources of Budget**

Next we asked respondents how their technology transfer budgets were financed. One hundred and twenty six institutions reported the mechanism by which their budget was financed. The number of institutions reporting all or part of their budget coming from different sources is shown in Figure 3.
This analysis shows that most TTOs receive their budget from a variety of sources. We found that 47% of universities receive part of their budget from the institution and part from licensing revenue. This reflects the reality (discussed in more detail below) that while many TTOs make money, few make enough to cover all of their expenses without some contribution from the institution. For Research Institutions, 57% are entirely funded by their institutions; at Hospitals, 38% are fully-funded by their institutions.

**Factors Impacting How the TTO Budget is Financed**

We examined the ways in which the source of the TTO budget correlated with the total research funding of the institution.

We found a very clear correlation between the size of a university’s research budget and how its TTO is financed. As shown in Figure 4, at very small universities, over 60% of TTOs are entirely funded by the institution, while none are funded entirely by licensing income. In contrast, at large and very large universities, a significantly larger number of TTOs are funded entirely from licensing income, and relatively few are funded entirely by the institution.
Operating Results

We did not ask for data on income generated by the offices from their licensing activities. However, we did ask respondents to report the financial contribution their office made to its institution.

As discussed by Brandt et al., the profitability of an office depends on the view taken of income. There are many claims on licensing income. As a requirement of Bayh-Dole, one portion of licensing income must be shared with inventors. The balance is required to be spent on research and education, which in practice means that part of the income is shared with some combination of the inventor’s laboratory, department, and college to be spent on research, with the institution retaining only a portion to offset the operating costs of the office. The financial contribution of the technology transfer operation to the institution therefore depends on whether the calculation includes the portion of income that goes to the inventors, the portion of income that is distributed and spent on research, or just the portion that is retained to reimburse the patent expenditure and operating costs.

We therefore asked the institutions to characterize their financial performance as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss Making</td>
<td>Total expenses exceed total income</td>
</tr>
<tr>
<td>Gross Profitable</td>
<td>Total income exceeds total expenses</td>
</tr>
<tr>
<td>Net Profitable</td>
<td>Total income less distribution to inventors exceeds total expenses</td>
</tr>
<tr>
<td>Self-Sustaining</td>
<td>Total income less distribution to inventors, colleges/labs, provost, university etc. exceeds total expenses</td>
</tr>
</tbody>
</table>
The results are shown in Table 11. Over 50% lose money on their technology transfer operations, while only 16% are self-sustaining, retaining more from net income after distributions to inventors and for research than is spent on patent protection and operating costs. These results show that technology transfer is considerably less financially beneficial to institutions than was predicted by the Brandt et al. model, which predicted that only 42% were loss-making and that 30% of institutions were self-sustaining.

Table 11. Financial Contribution to Institution from Technology Transfer

<table>
<thead>
<tr>
<th>Financial Contribution</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss making</td>
<td>68</td>
<td>52.3%</td>
</tr>
<tr>
<td>Gross profitable</td>
<td>27</td>
<td>20.8%</td>
</tr>
<tr>
<td>Net profitable</td>
<td>14</td>
<td>10.8%</td>
</tr>
<tr>
<td>Self sustaining</td>
<td>21</td>
<td>16.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>130</strong></td>
<td></td>
</tr>
</tbody>
</table>

Factors Impacting Profitability

We found that research institute TTOs were more profitable than those at universities and hospitals, and that private institutions were more likely to be profitable than public institutions, as shown in Figure 5.

Figure 5. Profitability of TTOs by Institution Type
We found a direct correlation between the size of an institution’s research budget and its profitability. The larger the research budget, the more likely the office was to be profitable, as shown in Figure 6. At very large schools, 15% are loss-making, and 31% are self-sustaining. By contrast, at very small schools, 76% are loss-making and none are self-sustaining. The relationship between size and profitability is almost linear—as the research budget of the institution increases, the profitability of the TTO increases.

Table 6. Profitability of University TTOs by Research University Budget

We also looked at how the profitability of TTOs correlates with the size of the office. The results are shown in Figure 7. We found that the correlation between TTO profitability and office size closely follows the correlation between profitability and total research budget. None of the very large universities are operating at a loss, and none of the very small universities are self-sustaining.
This conclusion confirms the findings of Brandt et al., who found that the greater the age, FTE count, and research budget of a TTO, the more likely it was to be profitable. Further, they discovered that the TTOs of only those institutions that were 15 years old and had a research budget greater than $500 million and had a total staffing of 20 FTEs were all profitable—a very stringent set of conditions.

Reinforcing the relationship between staffing levels and profitability, a 2006 study by the Milken Institute (DeVol et al., 2006) went so far as to calculate that an incremental investment of $1 in TTO salaries would generate an additional $6 in license income.

We also looked at the relationship between reporting structure and profitability and found no significant correlation.

**Drivers of Technology Transfer**

The next section of the survey dealt with the informal drivers of technology transfer in an institution. By asking directors of TTOs for their rankings of the possible drivers of behavior, we hoped gain an understanding of how TTOs prioritize the forces shaping their behavior in their daily decision-making.

First, we asked the respondents what drives the TTO. Respondents were asked to rank six factors in order of priority from 1 to 6:

- Revenue maximization
- Faculty service
- Research results translation
- Industrial sponsored research income
Table 12 shows how many institutions ranked each factor as the most important driver of their office. Faculty service was ranked first most often, followed by translating research results. Maximizing revenue was ranked most important by only 11.5% of institutions.

We did not include “Economic Development” as an option, which anecdotally is reported to be a significant driving force at publicly owned institutions. This may explain the relatively high number of “Other” responses.

Table 12. Top-Ranked Drivers of Technology Transfer

<table>
<thead>
<tr>
<th>Driving Factor</th>
<th>Number of Institutions</th>
<th>Ranking Factor First</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Service</td>
<td>51</td>
<td>39.2%</td>
<td></td>
</tr>
<tr>
<td>Translating Research Results</td>
<td>45</td>
<td>34.6%</td>
<td></td>
</tr>
<tr>
<td>Revenue Maximization</td>
<td>15</td>
<td>11.5%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>15</td>
<td>11.5%</td>
<td></td>
</tr>
<tr>
<td>Research Support</td>
<td>4</td>
<td>3.1%</td>
<td></td>
</tr>
<tr>
<td>Risk Management</td>
<td>0</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Factors Impacting Drivers of Technology Transfer

As shown in Table 13, the drivers were broadly similar for both universities and research institutions, with research results translation being the most important factor at research institutions while faculty service was most important at universities. At hospitals, research results translation was again the most important factor, while financial factors—revenue maximization and research support—were relatively more important than they were for universities and research institutions.

Table 13. Top-Ranked Driver of Technology Transfer by Type of Institution

<table>
<thead>
<tr>
<th>Type of Institution</th>
<th>Top-Ranked Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Univ.</td>
<td>Faculty Service</td>
</tr>
<tr>
<td>Private Univ.</td>
<td>Faculty Service</td>
</tr>
<tr>
<td>Public Res. Inst.</td>
<td>Research Results Translation</td>
</tr>
<tr>
<td>Private Res. Inst.</td>
<td>Faculty Service</td>
</tr>
<tr>
<td>Hospital</td>
<td>Research Results Translation/Other</td>
</tr>
</tbody>
</table>

As shown in Figure 8, as the size of the university increases, the top driver changes from Faculty Service (over 60% in small and very small universities) to Research Result Translation (35% and 54%, respectively, at large and very large universities). The choice of Revenue Maximization as the top driver increases linearly from very small to large schools, but is not a factor at any very
large schools. Industrially Sponsored Research Income was listed as the top driver at so few schools that we regarded it as not significant.

![Bar chart showing top ranked driver of behavior by university research budget](image)

**Figure 8. Top Ranked Driver of Behavior by University Research Budget**

As shown in Figure 9, when we compared public and private universities, we found that Faculty Service is the top-ranked driver at a much higher rate at private universities than at public universities (56% vs. 41%, respectively), and Research Result Translation is chosen by a greater number of public universities than private universities (34% vs. 26%). Revenue Maximization was listed at the number one driver at 14% of public universities versus only 7% of private universities.
As shown in Figure 10, when we looked at the top-ranked drivers of TTO behavior we found a steady decrease in the importance of faculty service to research results translation as total research expenditures increase.

Figure 9. Top-Ranked Driver of Behavior at Public vs. Private Universities

Figure 10. Effect of Research Budget Size on Top-Ranked Driver of Behavior at Public Universities
We looked at whether the top driver of TTO behavior correlated with the organizational structure—i.e., do the priorities of the TTO change if the TTO reports to the administrative side of the university versus reporting to the academic side, and found no significant difference.

Finally, we examined whether having revenue maximization as the top driver of technology transfer translated into enhanced profitability. The results are shown in Table 14. There is no clear correlation between the two.

The results of these analyses show that an industry standard seems to have been adopted throughout the profession. Translating research results and providing a service to the faculty are clearly the primary drivers of TTO behavior, whether the TTO is large or small, private or public, or whether it is making money or losing money.

Table 14. Top Drivers of TTO Behavior Based on Profitability (All Institutions)

<table>
<thead>
<tr>
<th>Profitability</th>
<th>No.</th>
<th>Research Result Trans.</th>
<th>Faculty Service</th>
<th>Revenue Maximization</th>
<th>Industrial Sponsored Research</th>
<th>Risk Management</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss-Making</td>
<td>58</td>
<td>31%</td>
<td>45%</td>
<td>12%</td>
<td>9%</td>
<td>0%</td>
<td>7%</td>
</tr>
<tr>
<td>Gross Profit</td>
<td>24</td>
<td>33%</td>
<td>38%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
<td>13%</td>
</tr>
<tr>
<td>Net Profit</td>
<td>12</td>
<td>33%</td>
<td>42%</td>
<td>25%</td>
<td>0%</td>
<td>0%</td>
<td>8%</td>
</tr>
<tr>
<td>Self-Sustaining</td>
<td>18</td>
<td>33%</td>
<td>39%</td>
<td>11%</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
</tr>
<tr>
<td>Total</td>
<td>112</td>
<td>32%</td>
<td>42%</td>
<td>13%</td>
<td>4%</td>
<td>0%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Technology Transfer Office Mission

We next asked institutions if the technology transfer office has a formal mission statement. The results are shown in Table 15. A surprising number of offices do not have a formal mission statement.

Table 15. Technology Transfer Offices with a Formal Mission Statement

<table>
<thead>
<tr>
<th>Formal Mission Statement</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>75</td>
<td>58.6%</td>
</tr>
<tr>
<td>No</td>
<td>53</td>
<td>41.4%</td>
</tr>
<tr>
<td>Total</td>
<td>128</td>
<td></td>
</tr>
</tbody>
</table>

We next asked those offices that have a formal mission statement to provide us with information on their mission statement. While only 75 institutions answered yes to this question, 80 submitted a copy of their mission statement.

The following are typical of the mission statements we received:

The XXXX Office of Technology Transfer promotes and supports the research enterprise at the University by creating relationships with the private sector to develop, protect, transfer and commercialize research results for the public benefit.
As a service provider, assist XXXX, its researchers, and its community partners with the development and promotion of biomedical innovations.

- “Support the educational, research, and healthcare mission of the University by fostering creativity and innovation.
- Initiate and sustain cooperation and collaboration between the University and business and industry.
- Act as the University’s intellectual property management and technology marketing arm.
- Advance healthcare-related economic development for our state and the nation.
- Support economic development through technology licensing.”

It is the mission of the TTO to encourage broad practical application of System research for public benefit; to encourage and assist those associated with the System in the protection, licensing and commercialization of their discoveries; to ensure the equitable distribution of royalties and other monetary benefits resulting from the commercial application of intellectual property; and to see that commercialization activities benefit the research, education and outreach missions of the System into the future.

We searched all of the mission statements for keywords such as “value”, “income”, “revenue”, “financial return” and “maximize” that would speak to a focus on financial return. We found mission statements such as:

Promoting the transfer of XXXX’s life science & medical technologies for public use and benefit, while generating income to support campus research and education.

Our mission is to help facilitate scientific research at the Institute, promote transfer of Institute basic research discoveries to the marketplace for the public benefit, and generate revenue for further research.

- To facilitate the movement of Institute's inventions from research to application.
- To create value in the inventions by protecting them with patents and ensuring Institute’s ownership rights.
- To commercialize Institute's intellectual property in accordance with Institute’s mission and external granting agency guidelines (NIH, NSF, HHMI).
- To generate revenue for Institute, its inventors and its continued research through commercial licensing.
- To facilitate development of the local Biotechnology Industry and economy. (emphasis added in each case)

The term financial return did not occur in any of the mission statements, and the words maximum and maximize each occurred only once in each of two mission statements that were the only ones that seemed to establish maximizing financial value and return as the mission of the office.

To maximize the value of XXXX’s intellectual assets through the creation of novel and effective models for commercializing technology.
The essential mission of the Office of Technology Transfer is twofold:

1. to promote the timely transfer of commercially valuable knowledge and inventions developed in the University to the businesses most capable of reducing them to practice and benefiting the economy of XXXX and the nation, and

2. to return maximum value for such commercialization to the inventor/s and to the University in support of its continuing research enterprise, in a manner which upholds sound ethical, legal, and academic standards. The value of technology licensing for the University includes its benefits in providing incentive to faculty for research and invention as well as the dollars received for financing continuing University research activity. (emphasis added in each case)

Incentive Compensation

The final section of questions concerned incentive compensation. We first asked whether any personnel in the office receive incentive compensation. The results are shown in Table 16. Clearly only a minority of personnel receive bonuses.

Table 16. Offices in Which Some Personnel Receive a Bonus

<table>
<thead>
<tr>
<th>Do Some Personnel Receive a Bonus?</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>22</td>
<td>17.2%</td>
</tr>
<tr>
<td>No</td>
<td>109</td>
<td>85.2%</td>
</tr>
<tr>
<td>Total</td>
<td>131</td>
<td></td>
</tr>
</tbody>
</table>

Next we asked how many personnel in the office receive bonuses and compared the answer with the reported number of staff. The results are shown in Table 17. Clearly, in the relatively small number of offices that offer bonuses, bonuses tend to be offered broadly within the office.

Table 17. Availability of Bonuses within the Office

<table>
<thead>
<tr>
<th>Number Receiving Bonus</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>9</td>
<td>40.9%</td>
</tr>
<tr>
<td>More than the Professional Staff</td>
<td>3</td>
<td>(13.6%)\text{%} \right</td>
</tr>
<tr>
<td>All Professional Staff</td>
<td>2</td>
<td>9.1%</td>
</tr>
<tr>
<td>Fewer than All Professional Staff</td>
<td>2</td>
<td>9.1%</td>
</tr>
<tr>
<td>One</td>
<td>6</td>
<td>27.3%</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

Next we asked how the bonuses were calculated. First we asked whether they were calculated based on office performance, individual performance, or a combination of the two. The results are shown in Table 18. Clearly, the most prevalent practice is to incentivize a combination of total office performance and individual performance.
Finally, we asked for information on the bases on which bonuses are calculated. From a list of five specific factors, we asked whether each was taken into account in calculating bonuses and, in addition, allowed respondents to identify one or more “other” factors. Respondents could identify as many factors as were relevant to their experience.

To analyze the data, we first reviewed what was entered in the “other” column, and entered the count for the number of specific factors identified by respondents.

Twenty one of the 22 respondents who reported that they had an incentive compensation plan identified the factors taken into account in computing incentive compensation. The 21 respondents reported 81 factors that were taken into account. A statistical analysis of the responses is shown in Table 19. Both the mean and the median Incentive Compensation Plans took into account four factors, though several only took into account one factor and one plan took into account eight factors.

As shown in Table 20, the most common factor taken into account in computing Incentive Compensation was “Other”, followed by Total Income and Transactions Completed, followed by Disclosures Received.

<table>
<thead>
<tr>
<th>Calculation Basis</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual performance</td>
<td>2</td>
<td>8.7%</td>
</tr>
<tr>
<td>Office performance</td>
<td>4</td>
<td>17.4%</td>
</tr>
<tr>
<td>Combination of office + individual</td>
<td>17</td>
<td>73.9%</td>
</tr>
<tr>
<td>Total</td>
<td>23*</td>
<td></td>
</tr>
</tbody>
</table>

* One respondent answered “NO” to question about having an office bonus scheme, but then gave details of a bonus scheme—that it was available to all professional staff and that it was based on overall office performance.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.90</td>
</tr>
<tr>
<td>Median</td>
<td>4.00</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>2.57</td>
</tr>
<tr>
<td>Min</td>
<td>1.00</td>
</tr>
<tr>
<td>Max</td>
<td>8.00</td>
</tr>
</tbody>
</table>

Table 19. Factors Taken into Account in Awarding Incentive Compensation

<table>
<thead>
<tr>
<th>Factor</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>18</td>
<td>22.2%</td>
</tr>
<tr>
<td>Total income</td>
<td>14</td>
<td>17.3%</td>
</tr>
<tr>
<td>Transactions completed</td>
<td>14</td>
<td>17.3%</td>
</tr>
<tr>
<td>Disclosures received</td>
<td>10</td>
<td>12.3%</td>
</tr>
<tr>
<td>Operating surplus</td>
<td>9</td>
<td>11.1%</td>
</tr>
<tr>
<td>Faculty satisfaction</td>
<td>9</td>
<td>11.1%</td>
</tr>
<tr>
<td>Start-ups formed</td>
<td>7</td>
<td>8.6%</td>
</tr>
<tr>
<td>Total</td>
<td>81</td>
<td></td>
</tr>
</tbody>
</table>
The “Other” category included the following, several of which were cited by multiple respondents:

- Beneficial products and services introduced to society
- Community service
- Exclusive licenses
- Faculty education activities
- New revenue
- Overall university financial performance
- Performance against specific targets
- Regional economic impact

Only two of these factors—Total Income and Operating Surplus—are financial return-oriented and account for 28.4% of the factors cited, while the remaining 10 are oriented toward broader measures of technology transfer performance.

ANALYSIS AND DISCUSSION

Our methodology was designed to make four independent determinations of the behavior of technology transfer in an institution through four independent sets of questions:

- How is the office financed?
- What drives the office—i.e., what behavior is the office actually demonstrating?
- What are the office’s incentives based on—i.e., what behavior does the institution really want and is prepared to pay extra for?
- What is the official mission of the office—i.e., what behavior has the institution told the office it wants from it?

First, looking at the sources of the TTOs’ operating budget, we found that 20.3% of offices are required to generate between 50% and 100% of their operating budgets from their license income. These institutions clearly have an incentive to maximize the income they generate simply in order to stay in business.

Next, looking at the actual behavior the offices displayed, we found that the most important drivers of technology transfer were faculty service and translation of research results. Only 11.5% of offices stated that maximizing revenue was the most important driver of technology transfer.

Third, looking at the behavior the institution really wanted and was prepared to pay extra for to obtain, we found that fewer than 20% of institutions provided incentive compensation to their TTOs; among those that did, only 28% of the factors taken into account in determining incentive compensation focused on financial return, with the remainder focused on broader, non-financial measures of performance. This means that only 5.6% of offices were incented based on financial performance.

Finally, the most visible way to make income important is to put it in the TTO’s mission statement. While a surprisingly high percentage of TTOs had no formal mission statement, only 2 out of 80 institutions that did have a formal mission statement—2.5%—mentioned maximizing
income or revenue in their mission statement. This proportion falls to 1.6% of the 128 institutions that gave either a “yes” or “no” answer to the question on whether they had mission statements.

The results of these four separate determinations are summarized in Table 21:

<table>
<thead>
<tr>
<th>Area of Investigation</th>
<th>Extent Driven by Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Budget</td>
<td>20.30%</td>
</tr>
<tr>
<td>Drivers</td>
<td>11.50%</td>
</tr>
<tr>
<td>Incentive Compensation</td>
<td>5.60%</td>
</tr>
<tr>
<td>Mission Statement</td>
<td>2.30%</td>
</tr>
</tbody>
</table>

**CONCLUSION**

The results of these four independent determinations were consistent in demonstrating that financial return is not the major factor in technology transfer organization and behavior, as is often posited.

There is a very clear trend in our results and an obvious conclusion to be drawn from them, namely that the more visible the factor we used to determine TTO behavior, the lower the frequency with which we found income maximization to be the most important factor.

- The most indirect way of encouraging revenue maximization is to make the operating budget of the TTO dependent on the income it generates. This had the highest incidence—20.3% of TTOs were required to generate half or more of their operating budget from the income they generate.
- Also subtle were the priorities that the TTOs reported as driving their activities; here only 11.5% of TTOs reported that revenue maximization was their most important driver.
- Including revenue maximization as part of an incentive compensation program means that an institution has made a formal, senior-level determination that it wants the TTO to maximize revenue, and is a much more overt measure. We found revenue maximization accounted for only 5.6% of incentive compensation.
- Finally, the most visible and public statement of an institution’s desire for its TTO to maximize revenue is to include revenue maximization in the TTO’s mission statement. Only 2.3% of the mission statements we were sent included revenue maximization as one of the TTO’s missions.

We therefore conclude that, depending on the visibility of the measure of what drives the TTO, from 2.3% to 20.3% of technology transfer activities are driven by financial considerations, with most activity being driven by broader objectives such as translation of research results and service to the faculty.

Which of these four very different figures represents the “best” measure? The average of the four figures is 9.9%, which is reasonably close to the 11.5% of TTOs that reported revenue maximization as the primary driver of their activities. If someone wanted to summarize our
findings in a Twitter, we would suggest, “Only 10% of technology transfer activity in the U.S. is driven by revenue maximization”—or perhaps its corollary, “90% of technology transfer activity in the U.S. is driven by social rather than revenue considerations.”

We therefore respectfully disagree with the conclusions reached by Litan et al. discussed in detail earlier, in which they concluded that:

…TTOs have been charged with concentrating too heavily on maximizing revenues from the licensing of university-developed intellectual property, rather than maximizing the volume of innovations brought to the marketplace (Litan et al., 2007, n.p.).

In our research we found the direct opposite—that translating the results of research and servicing faculty are the primary drivers of technology transfer offices.

We believe these results are not surprising in light of the way technology transfer is organized in the U.S. Fewer than 15% of TTOs are organized as independent corporations. An independent corporation can develop a culture that is quite distinct from that of the parent institution, whereas if the TTO is an integral part of the institution, it will inevitably share its culture. Outside the U.S., particularly in the UK and Australia, independent corporations tend to be the preferred TTO model. The extreme example of an independent corporation is Imperial Innovations, PLC, the technology transfer arm of Imperial College, London, which is an independent corporation that is publicly traded on the Alternative Investment Market of the London Stock Exchange. Clearly, Imperial Innovations has a fiduciary responsibility to its shareholders to maximize its profits, and it can no longer hew to the university’s charitable mission.

Finally, we confirmed an earlier study that found that for over half of institutions, technology transfer is actually a cost to the institution rather than a source of income and that only 16% of institutions retain enough of their income to reimburse all the costs of operating their TTOs, after sharing their income with various stakeholders, such as inventors, labs, and the university.

We therefore predict that institutions which established their TTOs in the expectation of a “big hit” are likely to be disappointed; however, institutions that establish their offices with a broad set of goals will likely see their objectives realized.

We should conclude with a caveat. The above findings and conclusions should not be interpreted as implying that TTOs do not care about the financial terms of the license transactions they negotiate and will “give” the technology away. Far from it. Technology transfer offices have a strong sense of fairness and will fight hard to ensure that their institution shares fairly in the fruits of success if their technology is successful in the marketplace. Rather, our conclusions mean that income is not the primary motivator of offices; technologies with smaller market potential will receive as much attention as those that serve large markets; if there is a single, credible potential licensee interested in a technology, then the office will negotiate exclusively with that company rather than seeking additional licensees to create a competitive bidding situation; junior faculty will receive as much attention as senior faculty; and non-financial, academic and social considerations will be taken into account in negotiating deals.
Public Policy Implications

Although it was not one of the objectives of our research, our study has important public policy implications for the role of academic research in innovation ecosystems, both in the U.S. and globally.

The Bayh-Dole Act was intended to break down the Chinese walls that had grown up between academic and corporate research and to integrate academic innovation into the U.S.’s innovation ecosystem. While it is beyond the scope of this article to discuss the economic impact of Bayh-Dole, studies have shown that it has succeeded admirably in this regard (Bayh, Allen, & Bremer, 2009; Jensen et al., 2009; Roessner et al., 2009). However, our study leads to the surprising conclusion that Bayh-Dole has turned out to be an unfunded mandate on U.S. academic institutions.

Bayh-Dole provided no direct funding for the technology transfer activity it was about to trigger. It was anticipated that the costs of technology transfer would be included in each institution’s indirect cost base and that, subsequently, licensing income would rise to cover the costs of the activity. Two factors changed this expectation:

1. The administrative component of indirect costs was capped at 26% in the early 1990s—IDC no longer covers the complete costs of carrying out research. A recent study found that U.S. patent costs are only included in the IDC base at three U.S. academic institutions.

2. Equally, licensing income has not grown fast enough to cover the cost of the technology transfer function at most institutions, for several reasons (Stevens, 2003). Licensing income grew slowly for several reasons. First, it took time for academic institutions to establish TTOs. The AUTM Annual Licensing Survey shows that the first wave of technology transfer offices were created fairly evenly over a thirteen-year period centered on 1990 (running from 1983 to 1996), not immediately after the passage of Bayh-Dole in 1980. TTOs continued to be created after 1996, albeit at a much slower rate, though there was another spike of start-ups in 1999 and 2000. Next, once TTOs were established, it took time to recruit and train staff, for a culture of technology transfer to develop on campuses, and for a portfolio of licensable inventions to develop. Then, because academic inventions are generally very embryonic and leading (bleeding?) edge, it generally takes from one to four years to find a licensee to make a commitment to develop a technology. And finally, since the majority of the most valuable academic inventions have been drugs, they have had to go through the 10- to 15-year clinical testing and FDA approval process.

The next issue is that few licenses generate substantial income. AUTM data show that only around 1% of licenses generate more than $1 million in income in any given year. While this may sound substantial, a typical TTO would distribute around $750,000 of the $1 million to inventors and for research and only retain around $250,000 to cover TTO patenting and operating costs. The data in Table 1 shows that the incidence of the truly “big hits” is even more unevenly distributed and is primarily concentrated in a relatively small number of institutions that have created important drugs and vaccines.

Finally, only a relatively small amount of license income is used to offset the costs of technology transfer. At most institutions, 60–75% of income is distributed to the inventors to incentivize
them to participate in the technology transfer process, and to laboratories and colleges to be spent on further research.

This issue also has implications outside the U.S. Over the past decade, many countries, initially in Europe and now in developing countries, have adopted the institutional ownership model of academic invention management pioneered by Bayh-Dole. Many have recognized this financial dilemma and have provided funding to kick-start the process. However, most have made the same assumption that the U.S. Senate did, and have provided funding for only relatively short periods of time—typically five years. Normally the TTOs are still well short of self-sustainability when the funding runs out and difficult decisions then have to be made.

We conclude, therefore, that new funding models for technology transfer are needed, both domestically and outside the U.S.

AUTHORS’ NOTE

We thank the Association of University Technology Managers for providing us with access to its Directors List, and Janine Anderson, Boston University, for her meticulous proof-reading of the manuscript.

END NOTES

2. http://www.autm.net/about/dsp.licensing_surveys.cfm
6. http://www.autm.net/about/dsp.pubDetail2.cfm?pid=41
7. One institution reported a patent budget of $600k and an operating budget of only $37k despite reporting two professional and one support FTE. It appears that they misunderstood the question and reported only their “All other” budget and not their total operating budget, and we did not include these data.
8. Imperial College owns 51% of the company’s stock.
9. For instance, the 2008 U.S. Annual Licensing Activity Survey found that of 15,498 licenses that were generating income, including 7,917 licenses that were generating running royalties (i.e., had advanced to a marketed product), only 192 licenses generated more than $1 million in income.

LITERATURE CITED


Coleman, M. S. (2005). Address before the Annual Meeting, Association of University Technology Managers, Phoenix, AZ.


Appendix

Questionnaire

1. Section 1. General Information about your office:

This is a small survey on how Offices of Technology Transfer are organized, missioned, financed and evaluated.

This survey will only take 5 minutes of your time to complete. All responses received will be treated as confidential information. You have our assurance that we will not disclose any information in a manner that allows it to be referred to any individual institution. We will only publish composite data and any stratification brackets for purposes of data analysis will be broad enough to include at least three institutions.

Thank you.

1. Your institution is a:

- University or College
- Hospital
- Research Institute
- Other (please specify)

2. Your institution is:

- Privately owned
- Publicly owned

3. What were the Total Research Expenditures (in million dollars) of your institution in the fiscal year 2007 (including overhead or indirect costs [IDC])?

Million $  

4. The Office of Technology Transfer is:

- A unit within the institution
- Part of an independent corporate entity (e.g., research foundation, wholly-owned not-for-profit, or for-profit corporation)

5. How many Full Time Employees (FTE) are there in your office?

- Professional licensing staff
- Supporting staff

6. Does the Office of Technology Transfer report up through:

- The Academic side of the Institution (i.e., ultimately to a Provost)
- The Administrative side of the Institution (i.e., ultimately to an Executive Vice President)
2. Section II. Budget

Please use budget data from the fiscal year 2007 in this section.

1. The Office of Technology Transfer is financed by: (Please enter a percentage %)

- Institution's operating budget
- License income earned
- A separate fund (e.g., income retained by an independent corporate entity)
- Other income sources

2. Does your office have SEPERATE Patent and Operating budgets?

- Yes
- No

3. To the nearest thousand dollars ($), what were your:

- NET Patent Expenses (patent expenses after reimbursement)
- Office Operating Expenses (i.e., personnel and other expenses)
- Total Expenses (all of the above)

4. Which category does your office fall into? (Total expenses as calculated in Question 3)

- Total Licensing Income is less than Total Expenses (Net Loss)
- Total Licensing Income exceeds Total Expenses (Gross Profit)
- Net Licensing Income (i.e., total income minus faculty personnel share) exceeds Total Expenses (Net Profit)
- After your institution retains a share of licensing income for general purposes, the remaining licensing income still exceeds Total Expenses (Fully Self-Supporting)
3. Section III. Your Mission:

1. What drives the Office of Technology Transfer? (Please rank the following choices from 1 to 6, with 1 being the MOST IMPORTANT.)

- Revenue maximization
- Faculty service
- Research results translation
- Industrial sponsored research income
- Risk management
- Other (Please specify in the Mission Statement box at the end of this section)

2. Does the Office of Technology Transfer have a formal Mission Statement?
   - Yes
   - No

3. If yes, what is the Mission Statement? (Please cut and paste the statement into the box below.)
4. Section IV. Incentive Compensation:

1. Do any personnel in the Office of Technology Transfer receive incentive compensation (bonus)?
   - Yes
   - No

2. How many people in the office are entitled to receive incentive compensation?
   

3. Incentive compensation is based on:
   - Individual performance
   - Overall office performance
   - Both

4. What is the incentive compensation based on? (Please choose all that apply.)
   - Total income
   - Operating surplus
   - Transactions completed
   - Disclosures received
   - Start-up companies formed
   - Faculty satisfaction
   - Other (please specify)

5. The end.

This is the end of the survey. Thank you very much for your participation.
Building Student Research Capacity: Faculty Perceptions about Institutional Barriers in Canadian Universities

Laura Ryser and Greg Halseth
University of Northern British Columbia

ABSTRACT

As part of a long tradition, university faculty have been incorporating students into their work to meet the increasing demands for collaborative research. However, some educational institutions in Canada lack appropriate policies and infrastructure to support the pedagogical aspects of student research training and development. Drawing upon experiences with the New Rural Economy project, we explore faculty perceptions of institutional barriers to building student research capacity through a Canadian multi-university research project. Findings indicate that pressures associated with tenure and promotion, and the unintended consequences of policies that guide research operations, do not support student research training and development during a student’s period of enrollment or during transition periods between their research degrees. Faculty also perceive limited mechanisms for sharing resources across educational institutions to facilitate student research engagement across multiple universities.

INTRODUCTION

In Canada, federal funding agencies are increasingly allocating resources to collaborative research (Gilroy, 2005) to tackle complex problems that require multiples sources of expertise, research approaches, and labor beyond what is available through individual researchers (Repko, 2008). As collaborative research becomes increasingly common, it is important to prepare students, our next generation of researchers, to engage in this more complex setting by providing them with a broad range of research experiences. However, it has been suggested that there is a
lack of appropriate policies, infrastructure, and other institutional supports to enable faculty to appropriately train this next generation of researchers (Council of Ontario Universities, 2004). Drawing upon experiences from the New Rural Economy (NRE) project, this paper explores institutional barriers that faculty confront as they work to build student research capacity and involvement at both the graduate and undergraduate levels. It begins by briefly exploring previous work on institutional constraints impacting student research pedagogy. Following a review of the methodology used for this study, we describe faculty experiences with institutional barriers that impact student research pedagogy across a multi-university, interdisciplinary research project. Despite a focus upon the experiences of faculty engaged in one project, many of the identified challenges could be more broadly applied to other types of research projects. As this study is exploratory, issues at each university, and across different types of universities, are likely to vary, and further investigation is needed to explore the extent to which the issues raised here are unique to collaborative or to rural research, or work themselves out in different academic environments.

INSTITUTIONAL CONSTRAINTS TO STUDENT RESEARCH TRAINING AND PARTICIPATION

With our focus upon multi-university research teams, we review previous work concerning a range of institutional factors that may have unintended consequences for collaborative research. This provides an important foundation for exploring how institutional policies, infrastructure, availability of personnel, and competing demands can impact the ways in which faculty provide student research training and development opportunities.

Policies, both explicit and hidden, can produce disincentives to pursue collaborative research. Universities in Canada, for example, are ranked in part by the number of research grants obtained by faculty. Benefits allocated by national funding agencies (for example: ‘institutional grants’ and the number of Canada Research Chairs the university may hold) are based upon national granting council success. Through contemporary approaches to allocating funding, faculty are encouraged to obtain resources, space, and funding for their school or department (Larson, 2003). These competitive undertones may discourage faculty from pursuing research collaborations that take more time and effort to develop.

The emergence of collaborative, interdisciplinary research teams is also challenged by traditional academic department structures that may not reward collaborative research, co-authored publications, or contributions outside of traditional disciplines as a part of the tenure and promotion process (Robinson, 1996). Further, little emphasis may be placed on the process of training students, especially undergraduate students, in a broad range of research skills and experiences (McCormack, 2004; De Weert, 2001). Obtaining research grants at some universities or in some departments (perhaps described as ‘primarily undergraduate’ or ‘teaching’ institutions) may also not be viewed as a critical aspect for tenure and promotion (Miner, Miner, & Griffith, 2003).

Halpain, Jeste, Trinidad, Wetherell, and Lebowitz (2005) found that the provision of early intensive research experiences can attract students into an academic career. Yet faculty across institutions and departments may have very disparate teaching and service loads that can impact the time available to engage in collaborative research, research training, and student mentoring (Lindsay, Breen, & Jenkins, 2002). Academic teaching commitments typically leave only
summer months for faculty and their students to focus on research (Panelli & Welch, 2005). Collaborative research can also expand faculty workloads with additional time required for interaction, dialogue, and coordination (Lattuca, 2001), while student training and mentoring can be more difficult when disciplines bring very different norms and expectations. To enable faculty to execute student training and research, universities may have policies in place to reduce teaching commitments or ensure faculty are scheduled with the same annual courses so as to alleviate teaching preparation time (Miner, Miner, & Griffith, 2003).

Universities and funding agencies may impose deadlines and performance schedules that do not dovetail well with teaching commitments and may intensify time restraints on faculty. Although there have been positive changes in Canada, granting adjudication committees have typically not been comprised of those with interdisciplinary research experience or interests (Wekerle, 1996). With the involvement of numerous universities, cross-university research teams must apply to many research ethics boards, each of which may have different forms, deadlines, timelines, processes, and requirements.

Through their respective ‘offices of research’, however, universities can provide logistical support to faculty to help them understand internal and external funding processes and expectations (Conn, Porter, McDaniel, Rantz, & Maas, 2005). Other departments, such as administration, libraries, or computing services, can provide mechanisms supporting the incorporation of students into research projects (Laughlin & Sigerstad, 1990; Lowry & Hansen, 2001). For example, Lau and Hayward (2000) explored the use of virtual networks in research training programs. Sufficient provision of laptops, software, Internet access, and technical support was important to broaden access to resources, and engage members in collaboration and problem-solving activities. Human resource offices have policies that establish the hiring mechanisms, classification, pay rates, and benefits afforded to students and other research staff. Together with finance offices, they also coordinate formal agreements needed to govern the distribution, monitoring, and reporting of research monies among team members (and participating institutions) over a project’s duration.

The allocation of human and financial resources for research support may indicate the level of a university’s commitment to research (Connelly, 1997). Unfortunately, research supports are unevenly available across university types and sizes (Davis, 1988). Klein (1990) noted that smaller universities tend to have more limited funding sources, part-time research involvement, and a small number of disciplines. With centralized monitoring and review of projects, larger universities often offer better administrative support for collaborative and cross-university research work. Lattuca (2001) and Robinson (1996) cautioned, however, that administrative and departmental philosophy, rather than institutional size, is more likely a key determinant in successful collaborative research. Even if universities have developed research support, administrative staff may not have formal responsibilities for supporting or understanding of how to support students in research projects (Hinck & Brandell, 2000).

Despite efforts to explore institutional support of, and constraints on, research, few studies have examined institutional policies and contexts that may impact pedagogical aspects of student research training. Drawing upon the NRE project, we explore faculty experiences with institutional barriers to building student research capacity in a multi-university, interdisciplinary research project.
METHODOLOGY

The research reported in this paper was conducted through the Canadian Rural Revitalization Foundation (CRRF) by members of its NRE team. The CRRF links rural residents, decision makers, businesses, service providers, and voluntary groups with researchers and policy makers to address challenges and opportunities associated with the new rural economy and to disseminate information in support of rural revitalization in Canada. The NRE (nre.concordia.ca) was created by CRRF to explore local capacity building in 32 sites across rural and small town Canada (Reimer, 2002).

The NRE is an interdisciplinary, multi-university research project which drew together researchers working with a common “conceptual framework to synthesize two or more disciplinary approaches” (Graybill, Dooling, Shandas, Withey, Greve, & Simon, 2006, p. 757), with a common methodological approach, share of research responsibilities, and activities to facilitate group interaction and the generation of ideas (Qin, Lancaster, & Allan, 1997). Utilizing researchers from many disciplines, the goal of the research was to obtain a greater understanding of the complex ways in which small communities are responding to change. The NRE project is structured into five Research Centers (aligned with the topics of Governance, Environment, Services, Communications, and Integration) that control research resources and manage research activities. The Research Partners work with the Research Centers in developing and executing research activities, but they are mainly responsible for deploying students to collect data and maintain relationships with residents in study sites located within their region. The project was funded by the Social Sciences and Humanities Research Council’s (SSHRC) “Initiative on the New Economy” program.

Prior to our research for this paper, the NRE had been engaged in research activities for seven years. Large-scale, national interdisciplinary research projects in the social sciences have not been common in Canada. Our experiences with a multi-university collaborative project motivated us to document faculty experiences that may inform future policy and research. While the literature has documented various general obstacles to student research pedagogy (Lattuca, 2001), less is known about the complications that multi-institutional contexts may have on the training and development of our next generation of researchers. Using an exploratory, qualitative methodology, we sought to understand how different institutional contexts affect the pedagogy of student research training.

The NRE has involved 19 faculty and 101 students from 14 universities across Canada between 1998 and 2005 (Figure 1). Faculty and students bring expertise and knowledge from a range of disciplines, including sociology, geography, gender studies, economics, anthropology, environmental studies, rural development, forestry, and resource management. This paper draws upon in-depth interviews conducted with the 11 faculty members in the NRE (Table 1). The sample includes faculty of different genders, from both Research Centers and Research Partners, and from both primarily undergraduate and comprehensive universities. To develop recommendations for building student research capacity, open-ended questions were used to explore institutional constraints/supports. Faculty were asked to describe their access to potential student researchers, strategies used to recruit students both within and outside of the university, how students were connected with various NRE projects across the country, any institutional constraints that impacted student participation, and about any faculty initiatives or opportunities afforded by universities to incorporate students into the NRE project. These open-ended research
questions were informed from the literature and the personal experiences of the authoring research team.

Figure 1. Canadian Universities Involved in the NRE Project
Note: Map abbreviations are: UNBC (University of Northern British Columbia), UQAR (Université du Québec à Rimouski), UQAT (Université du Québec en Abitibi-Témiscamingue), and UNB (University of New Brunswick).
### Table 1. Characteristics of Faculty Involved with the New Rural Economy Project

<table>
<thead>
<tr>
<th>Research Center or Research Partner</th>
<th>Type of University</th>
<th>Gender of Faculty</th>
<th>Students’ Level of Study</th>
<th>Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Center</td>
<td>Comprehensive</td>
<td>Male</td>
<td>3 Ph.D. students 19 M.A. 7 B.A.</td>
<td>Sociology, Anthropology</td>
</tr>
<tr>
<td>Research Center</td>
<td>Primarily undergraduate</td>
<td>Male</td>
<td>3 Ph.D. students 2 M.A. 1 B.A.</td>
<td>Sociology</td>
</tr>
<tr>
<td>Research Center</td>
<td>Comprehensive</td>
<td>Male</td>
<td>2 Ph.D. students 3 M.A. 2 B.A.</td>
<td>Sociology, Forestry, Resource Management</td>
</tr>
<tr>
<td>Research Center</td>
<td>Primarily undergraduate</td>
<td>Male</td>
<td>7 B.A.</td>
<td>Geography</td>
</tr>
<tr>
<td>Research Partner</td>
<td>Primarily undergraduate</td>
<td>Male</td>
<td>2 M.A. 1 B.A.</td>
<td>Geography, Rural Studies</td>
</tr>
<tr>
<td>Research Partner</td>
<td>Primarily undergraduate</td>
<td>Male</td>
<td>2 M.A. 3 B.A.</td>
<td>Sociology</td>
</tr>
<tr>
<td>Research Partner</td>
<td>Comprehensive</td>
<td>Female</td>
<td>3 Ph.D. students 4 M.A.</td>
<td>Planning, Rural Development</td>
</tr>
<tr>
<td>Research Partner</td>
<td>Primarily undergraduate</td>
<td>Male</td>
<td>2 M.A. 2 B.A.</td>
<td>Sociology</td>
</tr>
<tr>
<td>Research Partner</td>
<td>Primarily undergraduate</td>
<td>Female</td>
<td>1 M.A.</td>
<td>Sociology</td>
</tr>
<tr>
<td>Research Partner</td>
<td>Primarily undergraduate</td>
<td>Male</td>
<td>2 M.A. 3 B.A.</td>
<td>Sociology, Environmental Studies</td>
</tr>
<tr>
<td>Research Partner</td>
<td>Comprehensive</td>
<td>Male</td>
<td>6 B.A.</td>
<td>Sociology</td>
</tr>
</tbody>
</table>

**Notes:**
- Ph.D. = doctoral student; M.A. = Master’s student; B.A. = Bachelor’s student
- Classification of university ‘type’ is derived from a Canadian discourse popularized by the *Maclean’s* magazine [http://oncampus.macleans.ca/education/2008/12/19/our-18th-annual-rankings/] and its annual ranking of academic institutions. Primarily Undergraduate universities focus on undergraduate education and have few graduate programs. Comprehensive universities have significant research programs and a wide range of undergraduate and graduate programs.

Faculty interviews were conducted by research assistants from the University of Northern British Columbia. Interviews were transcribed verbatim for analysis. Using both manifest and latent content analysis, responses from open-ended questions were then coded and categorized into themes (Babbie, 2004). Manifest content analysis describes specific words that are written or used, while latent content analysis explores a deeper or intended meaning. This entailed three rounds of coding conducted by two research assistants who were not involved in the interviews and who could bring a greater open-mindedness to emerging themes. Each round of coding was
also reviewed by the lead faculty researcher. In the first round, research assistants brainstormed key words and themes from an initial reading of the transcripts (Bailey, White, & Pain, 1999). These keywords provided the basis for manifest content analysis (Dunn, 2005). Themes identified from previous studies (i.e., policy challenges, lack of infrastructure, and competing demands on faculty) provided a basis for the latent content analysis (Robinson, 1998). The second round of manifest and latent content analysis entailed checking the occurrence of keywords or themes, revising accordingly by adding or collapsing categories, and developing a hierarchy of terms and themes. This includes identifying relationships between keywords and themes of similar meaning. For example, faculty concerns about “rules”, “regulations”, and “policies” were grouped under the theme “policy challenges”. The final round focused on latent content analysis. In addition to rechecking, it provided another round for testing the broader categories and themes within those categories. Triangulation was used to compare responses between participants and with previous literature to improve validity (Hycner, 1999).

**RESULTS**

Exploring faculty perceptions of institutional constraints that limit student research training through an interdisciplinary project can produce important recommendations concerning institutional operations and policies. Through interviews, faculty outlined five themes concerning institutional constraints: access to student researchers; the design of programs and research institutes; competing teaching, service, and research responsibilities; policy challenges; and financial challenges.

**Access to Student Researchers**

Given that many of the participating universities in the NRE project are small and primarily undergraduate, faculty are challenged to execute research due to limited access to potential student researchers (Table 2). Some universities do not have graduate or Ph.D. programs, and even where such exist, institution size may limit the numbers of graduate students. While other Canadian research projects, such as Metropolis, have larger participating universities and a greater proportion of Ph.D. and post-doctorate students, participating universities also report considerable differences with access to student researchers at the undergraduate, graduate, doctorate, and post-doctorate levels (CERIS, 2010; Lamba, Maximova, Mulder, & Shankar, 2002; Pendakur & Yan, 2009). Access to sufficient graduate students provided some faculty with greater stability and continuity over the course of the NRE project. Such stability also affords students a greater range and duration of research experiences (Ryser, Halseth, & Thien, 2009). Length of research terms has been linked to successful student recruitment (Seymour, Hunter, Laursen, & Deanton, 2004).
Table 2. Institutional Barriers to Building Student Research Capacity

<table>
<thead>
<tr>
<th><strong>Limited Access to Student Researchers</strong></th>
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<tbody>
<tr>
<td>Limited access to graduate students</td>
<td>Competition to recruit and retain student researchers</td>
</tr>
<tr>
<td>Competition to recruit and retain student researchers</td>
<td>Other jobs</td>
</tr>
<tr>
<td>Other jobs</td>
<td>Volunteer commitments</td>
</tr>
<tr>
<td>Volunteer commitments</td>
<td>Lack of interest in research</td>
</tr>
<tr>
<td>Lack of interest in research</td>
<td>Lack of interest in rural issues</td>
</tr>
<tr>
<td>Lack of interest in rural issues</td>
<td>Lack of experience/expertise amongst students</td>
</tr>
<tr>
<td>Lack of experience/expertise amongst students</td>
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</table>

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<tr>
<th><strong>Design of Programs and Research Institutes</strong></th>
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</thead>
<tbody>
<tr>
<td>Limited courses covering rural topics</td>
<td>Limited graduate programs</td>
</tr>
<tr>
<td>Limited graduate programs</td>
<td>Limited promotion of research units</td>
</tr>
<tr>
<td>Limited promotion of research units</td>
<td>Limited visibility of research projects</td>
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<td>Limited visibility of research projects</td>
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<tr>
<th><strong>Competing Teaching, Service Commitments, and Research Responsibilities</strong></th>
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<tbody>
<tr>
<td>Heavy course loads</td>
<td>Limited administrative support for teaching and research activities</td>
</tr>
<tr>
<td>Limited administrative support for teaching and research activities</td>
<td>Changing work schedules due to changing mix of contracts and teaching responsibilities</td>
</tr>
<tr>
<td>Changing work schedules due to changing mix of contracts and teaching responsibilities</td>
<td>Lack of time—faculty</td>
</tr>
<tr>
<td>Lack of time—faculty</td>
<td>Emphasis on products rather than training students</td>
</tr>
<tr>
<td>Emphasis on products rather than training students</td>
<td>Lack of evaluation mechanisms</td>
</tr>
<tr>
<td>Lack of evaluation mechanisms</td>
<td>Difficulty sustaining research activities to support research contracts</td>
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<td>Difficulty sustaining research activities to support research contracts</td>
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<table>
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<tr>
<th><strong>Policy Challenges</strong></th>
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<tbody>
<tr>
<td>Government funding agencies do not recognize students in transition periods</td>
<td>University regulations prevent faculty from hiring graduating students</td>
</tr>
<tr>
<td>University regulations prevent faculty from hiring graduating students</td>
<td>Government funding agency policies are geared towards larger university models</td>
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<tr>
<td>Government funding agency policies are geared towards larger university models</td>
<td>University caps regulate the number of hours that students can work</td>
</tr>
<tr>
<td>University caps regulate the number of hours that students can work</td>
<td>University regulations restrict the rate of pay for students</td>
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<tr>
<td>University regulations restrict the rate of pay for students</td>
<td>University procedures do not allow advances to cover field work expenses</td>
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<td>University procedures do not allow advances to cover field work expenses</td>
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<tr>
<th><strong>Financial Challenges</strong></th>
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<tbody>
<tr>
<td>Lack of funding for student training and development</td>
<td>Cumbersome procedures for invoices covering student expenses and research activities in an interdisciplinary project</td>
</tr>
<tr>
<td>Cumbersome procedures for invoices covering student expenses and research activities in an interdisciplinary project</td>
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</table>

Source: INE Faculty Interviews

Limited institutional support for students through mechanisms that include research assistantships contributes to an underdeveloped culture of seeking employment and training through university research projects. With a limited pool of student researcher candidates, there is further competition to recruit and retain the best students due to other employment/volunteer commitments (Panelli & Welch, 2005). As a result, fewer students than expected applied for research assistant positions. As one faculty member noted, “You don’t have 5 people applying for a position. You’re lucky if you get one” (ID#5).
In the NRE project, faculty at times experienced problems carrying out research due to the mixed quality and experience of students. For example, some faculty felt that few students had quantitative research skills—something exacerbated by the lack of methods courses among undergraduate and graduate curricula at some universities. The focus seemed to be on hiring independent students already equipped with research capabilities so that they make efficient contributions rather than using the research process to train new researchers. As depicted by one faculty participant, “if we didn’t have high quality and go getter students, I could not be a part of the project. It’s just too difficult” (ID#6). This orientation is grounded in pressures faced by faculty to produce publications for tenure and promotion. Unfortunately, many funding programs (or the evaluators assigned to review applications under those funding programs) and those on university tenure/promotion/merit committees still do not accord enough consideration to the time, support, and ultimate long-term benefits of faculty investing in the training and mentoring of new researchers.

In response to limited access to student researchers, faculty have ‘shared’ students. In the NRE project, there were cases in which graduate students from larger universities have conducted research with faculty at smaller institutions. Under such circumstances, cooperating faculty members share responsibility for student research pedagogy, and can broaden student exposure to different research approaches. Faculty have also used a variety of recruitment strategies, including through courses taught, orientation talks to incoming graduate students, word-of-mouth and referrals from other faculty and students, job advertisements, and general publicity and media stories about the project.

**Design of Programs and Research Institutes**

The development of programs and research institutes can also facilitate or constrain opportunities for building student research capacity (Porter, 2006). Given that most universities in Canada are located in urban centers, there is a structural challenge for the NRE that can make it difficult to convince urban-based students that rural research matters. This problem is exacerbated by the absence of rural development programs that could otherwise be a natural source of potential student researchers. As one faculty member explained, “We don’t have any program in local development or rural studies. Those programs don’t exist [here]. So it’s hard for me to find students who are interested in rural studies” (ID#10). Other rural-based research projects in Canada and Australia have expressed similar concerns about the impact that limited rural topic course offerings have had on the recruitment and development of rural health researchers (Kulig, Minore, & Stewart, 2004; Taylor, Hughes, Petkov, & Williams, 2005).

Institutions can capitalize on interdisciplinary research to create new teaching programs that might foster stronger linkages for student learning in both the academic and research settings (Klein, 1990). While previous work has suggested that student engagement may be impacted by university size (Porter, 2006), further research needs to explore linkages among university size, range of course/discipline offerings, and student interest and engagement in those same research topics.

In addition to the design of programs, departments, and curricula, institutional support for student research training now increasingly includes ‘research institutes’. Research institutes are one mechanism by which universities are responding to increased calls for collaborative and interdisciplinary research while leaving in place their rather more archaic structure of discipline-based departments and administrative reporting structures. However, limited promotion,
recognition, and support (financial and otherwise) of research institutes can limit their effectiveness in attracting/training student researchers. Where research institutes are in place, institutions can assist in making them more ‘visible’ to students, especially undergraduates, so that research training opportunities become a more common part of the student learning culture.

**Competing Teaching, Service, and Research Responsibilities**

Faculty identified several conflicting commitments associated with teaching, service, and research responsibilities that limited the time they could commit to training and mentoring students. Heavy course loads for teaching, especially at primarily undergraduate institutions, limit faculty’s ability to engage in student research training (Lindsay, Breen, & Jenkins, 2002). The increasing emphasis at Canadian universities to be ‘research intensive’ has not fit well with pre-existing university teaching and service duties. Senior administrators use research funding dollars as promotional points for their institutions, but the delivery of those dollars and the work needed to carry out the research has been ‘added’ to faculty who were already ‘fully employed’. While some universities support research funding success by working to reduce teaching loads, this is not universal. In Canada, funding agencies such as SSHRC have even reduced opportunities for research time stipends² (funds to ‘buy out’ faculty teaching) within many of their research grant programs. This contrasts to policies in the United States where researchers benefit from a broader range of federal programs, such as the American Recovery and Reinvestment Act (ARRA), federal agencies, such as the National Science Foundation and the National Institutes of Health, and foundations such as the Smith Richardson Foundation, that provide grants to buy-out teaching time of faculty engaged in research grant work (Gibson, 2010; National Institutes of Health, 2003; National Science Foundation, 2009; Smith Richardson Foundation, 2010).

Limited baseline financial support from institutions for research projects means that faculty are busy pursuing a mixture of teaching, contract work, and research. The constantly changing nature and demands of research activities, faculty teaching schedules, and student commitments impact the time available to create opportunities for training and mentoring the next generation of researchers. These challenges are compounded by the start dates, end dates, and reporting requirements of funding agencies.

As some faculty experience time constraints, it also becomes apparent that some students are not benefiting from a formal evaluation process to facilitate their research learning process. As one faculty member said, “We don’t have any form of formal evaluation of our student mentoring activities” (ID#8). Evaluation processes are important ways by which institutions communicate expectations (McCormack, 2004), and limited monitoring and evaluation of student research training through the research process can have serious consequences for both the student and the research.

Within this multi-university collaboration, there are uneven time and supports among faculty to participate in student research training. The ability to engage in ongoing mentoring activities can be further complicated by the distance and isolation that can exist among participating institutions. When asked if and how students were provided with opportunities to interact with faculty and students at other universities, faculty described how much easier it was to interact with researchers at the same institution. While frequent engagement between colleagues and students is critical to building interdisciplinary knowledge and collaborative research skills, typical opportunities for interaction (even with new information technologies) are not easily transferred to multi-university research. This is important as faculty and students may disengage
from future multi-university research collaborations due to such comparably more challenging circumstances.

Additional problems that may limit student researcher retention include securing enough funding to pay students a ‘living wage’. Research projects and contracts often have periods of intense work, such as when field work is conducted, and these periods typically require large numbers of student assistants. At other periods, there may be fewer demands for student assistance. Sporadic work (and resulting pay) may not provide enough stability to attract and retain potential student researchers in a competitive job market.

Finally, there are disconnects between teaching and research. As articulated by one faculty participant:

> The endeavor is very, very unrelated to what I teach at the undergrad level. I’m quite interested in it with my background and training, but I have this real disconnect between my undergrad experience in teaching and what I do with the graduate work (ID#11).

Some faculty have been successful in incorporating research into the undergraduate experience through the provision of directed or independent studies courses. Undergraduate students enrolled in special topics or directed studies courses would use NRE data and gain research experience, while both faculty and students would benefit from the academic products. Such courses also provide a tool by which faculty can test the quality of students who may later be hired as researchers. Institutional flexibility and responsiveness in allowing for the rapid development and delivery of special topics courses was shown through the NRE project as important in enhancing student interest and research training.

**Policy Challenges**

Faculty identified several policy constraints that affect their efforts to build student researcher capacity. Such institutional policy challenges were identified within funding agencies and within universities.

Given that the NRE project was supported by SSHRC funding, faculty noted how SSHRC policies sent mixed messages about the use of research funds towards experiential learning and capacity-building among new researchers. These mixed messages revolved around faculty perceptions of the words ‘students’ and ‘new researchers’, and the larger goal of helping students bridge their current academic careers with the future they hope to pursue. The problem is highlighted by one faculty member:

> Often, SSHRC wants us to hire students; but we’re often in a case, like with [student X], where he was a student and then has graduated. We want to keep him on because he’s got all sorts of talents and stuff, so he becomes part of the project. He was not a student, but I’m sure that the reason he’s now a student again is because he’s been working on the project. There’s a kind of a hiatus role there that doesn’t get recognized by SSHRC getting too adamant about us hiring students (ID#1).

If the goal is truly about training the next generation of researchers, then granting agency policies and practices must include broad language and programming to support that goal. At present, SSHRC does not have a program of undergraduate student summer research.
assistantship/internship grants to let undergraduates ‘test drive’ research work (even though their natural sciences counterpart in Canada and granting agencies in the United States provide such opportunities). Policies, practices, and language must also allow faculty to support undergraduate or graduate students who finish their degrees, but wish to continue conducting research for a short period of time before pursuing employment or a higher educational degree. Universities may also have policies that inadvertently prevent student researchers from working on research projects between their educational pursuits. For example, another faculty member indicated, “For students who are graduating, I couldn’t hire them under the university’s rules because they are ‘leaving’ the university” (ID#8).

Second, there was a perception that SSHRC (or the various project and peer evaluators identified by SSHRC) penalizes research projects for not having large numbers of doctoral or post-doctoral students engaged by the time of the project’s mid-term review. These expectations were felt to be based on larger university models that are not well suited to the participation of smaller, primarily undergraduate institutions. Given the increasing role of smaller universities in research and in developing student research capacity, the policies, practices, and language of support must be better aligned with the diversity of the Canadian university research landscape.

Within universities, there are also regulations or policies that limit (or manage) the amount of support graduate students may receive. For example, it was suggested that receiving a research assistant position may impact a student’s chance to receive additional university support. As one faculty member explained:

We can’t pay them for the first year and a half because they might not be able to get their GTA (Graduate Teaching Assistantship). … The GTA has regulations for how much you can work, and you have to negotiate things above that (ID#4).

This challenge also speaks to the sometimes conflicting and sometimes complementary tasks to be achieved through graduate student training. Graduate teaching assistantships provide a wonderful opportunity for students to gain teaching and classroom experience, while research funding support allows them the opportunity to build skills that also contribute to their career development. The ‘balancing act’ that many departments and universities undertake to ensure that as many graduate students as possible are supported through their studies may inadvertently create disincentives for developing experience in each of these core capacity areas.

It was also suggested that university regulations may restrict the rate of pay afforded to students according to their level of study. For example, faculty told us that:

The only constraint is the rate, and the rate is fixed. The pay rate is $12. For undergraduate students, it’s $10. For graduate students, it’s $12. I lost students because of that (ID#9).

Well I mean at XX University, we get our student assistant rates that come out every year, and we have to follow that. I despise that as well. It’s not their money. This is SSHRC money. If SSHRC doesn’t have a mandate on what a Master’s level student conducting primary fieldwork should get; if I want to pay a highly qualified and capable student $25 an hour, and that fits within SSHRC’s rules, I should be able to do that (ID#6).
Policies that regulate student wage rates can also make it difficult to recruit and retain good student researchers who may be easily find other jobs that pay higher wages. This can become more complicated after a student graduates and wishes to work as a researcher for a year or two before continuing on to their next degree. Unable to call such people ‘post-docs’, the student often falls under new university hiring and pay rules (especially in circumstances with comprehensive staff union agreements).

Financial Challenges

Key financial challenges were identified with respect to the flow of funding used to support training and capacity building for student researchers. These challenges focus upon the question of funding ‘certainty’ and the ‘paperwork trail’ that may not align with research cycles or the challenges of working in a multi-university research project.

Some universities have internal funding programs that can ‘bridge’ student support between projects. In some cases, these programs extend to undergraduate students interested in research opportunities. Even with support through the NRE project, many faculty still spent considerable time piecing together different sources of money to employ and retain students throughout the year. Some faculty, for example, utilized federal government summer student employment programs to help fund student research positions. These brought their own institutional problems associated with changing policies and regulations concerning who could qualify. For example, policy changes one spring meant that universities no longer qualified for student summer employment programs. Following complaints, these rules were reversed early in the summer. Fluctuations in policies and procedures can create difficulties for supporting student learning experiences on a consistent basis.

With the execution of research tasks, in multiple sites, on behalf of project leaders located at different research institutions, there was a need to fill out numerous invoices for the NRE Research Centers that have control over project funding. These additional procedural requirements between universities can be cumbersome and time-consuming for faculty not trained in these tasks. Such additional procedural requirements may create disincentives for faculty to become involved in future collaborative research projects.

Finally, the integrated model of research used by the NRE project involving student researchers at various universities created challenges for faculty trying to hire students from other universities. This is because regulations at some universities stipulate that students can only be paid by their institution. In terms of supporting students to carry out summer field work, some faculty were unable to obtain advances from other universities to cover their student’s expenses. As a result, there were times when faculty had to cover student field expenses out of their own bank account.

DISCUSSION

Despite the important role that students play in supporting research, the literature has paid limited attention to opportunities and constraints that institutional resources, infrastructure, policies, and procedures can have on pedagogical aspects of student research training. These factors can impact the type of research training and experiences afforded to students, and may ultimately impact if and how students pursue graduate studies or future research employment. Drawing upon
experiences with the NRE project, we explored faculty perceptions of institutional barriers to building student research capacity in Canadian universities.

With a focus on the Canadian research environment, our findings identify a range of institutional barriers related to limited access to student researchers; the design of programs and research institutes; competing teaching, service commitments, and research responsibilities; policies; and financial constraints that impact student participation. Each of these barriers has implications for project leaders, universities, and government funding agencies. Three items, in particular, can be highlighted.

First, the policies, actions, and pressures associated with tenure and promotion systems can direct faculty attention away from long-term investments in student research pedagogy in favor of short-term ‘product’ creation that can be linked directly to faculty career security. This becomes more complicated within an interdisciplinary or cross-university project in which faculty work under different norms and cultures with respect to the role, process, and supports for student training. Tenure and reward systems that value both collaborative research products and student research training should be developed.

Second, granting agencies and universities may also inadvertently put an emphasis on products rather than the process of training the next generation of researchers (Futures Task Force of the Council of Ontario Universities, n.d.). The gaps in funding support during a student’s academic career, or during transition periods between degrees, highlight the need for attention to a continuum of support to attract and retain the best potential candidates as new researchers. While funding agencies call for research proposals to include student training and development, a critical need is for support during transition periods between undergraduate and graduate degrees, and between student programs and public/private sector careers. More general support for ‘new researchers’ during this transition will also pay dividends through peer mentoring of less experienced student research assistants. Funding agencies will also need to incorporate a broader view of university models in their evaluation processes to recognize the varying accessibility of graduate students across institutions. Similarly, universities should work with union organizations and research teams to draft policies that would permit these new researchers to continue to work for research projects during student transition periods.

Finally, attention needs to be directed at mechanisms for sharing resources across educational institutions to facilitate student engagement and mobility across multiple universities. As noted above, the absence of courses or graduate programs can impact faculty access to students with the interest, skills, and expertise to engage in research. While it may not be feasible to create courses or programs in every research topic area, universities could build upon institutional agreements for sharing students in needed topic areas. One of the NRE project’s participating universities, the University of Northern British Columbia (UNBC), has this flexibility through a ‘Western Dean’s Agreement’ allowing for greater student mobility for courses and research experiences in universities across western Canada without having to enroll at those other institutions. Such flexible support platforms for building student capacity can also facilitate the sharing of resources and the harmonization of policies across educational institutions. Internal university support should also enable faculty to allocate (and be rewarded for) more time towards the pedagogical aspects of student research training. Significant changes are taking place and this demonstrates that it is possible for institutions to reform their administrative structures to be flexible in facilitating research support. Notably, inter-university financial transfers are becoming normalized and routinized.
In addition, other issues were raised with respect to institutional barriers to building student research capacity. For example, greater visibility is needed to promote opportunities for students to become involved in collaborative research. While research space provides visibility, there are also opportunities for the employees of the research project, communications office, and research office (Conn et al., 2005; Davis, 1988) to promote research visibility through newsletters, websites, signage, community and academic lectures, career fairs, and information sessions with students at the beginning of the academic year. To overcome sporadic recruitment methods, directory lists of staff willing to have undergraduate and graduate students assist with their research may further improve student recruitment. Long-term internal and external support must also be provided to support research institutes that function as a focal point or incubator of interdisciplinary research projects targeting strategic interests that would further provide stability and visibility to attract students.

This paper has drawn upon the faculty experiences of one interdisciplinary research project conducted on rural development topics across a number of Canadian universities. While some of the findings may be specific to cross-university projects, or to rural research, others speak more generally to the role of student research training. Further study could assess the capacity and institutional constraints of different types of institutions as they strive to develop the next generation of researchers. We know little about the type and quality of institutional support that students need, pursue, and receive. Future research could also explore the disconnection among government funding for research and faculty/student interests, how institutional support and constraints impact student decisions to pursue graduate studies or research careers, and successful strategies for recruiting new student researchers.

**END NOTES**

1. ‘Primarily undergraduate’ refers to institutions that have degree-granting status but do not offer (or offer a limited range of) graduate studies programs. For many of these institutions, internal and external measures of success focus upon numbers of students enrolled and graduated.
2. Recent federal government funding cutbacks to SSHRC have put a number of programs, including research time stipends, in jeopardy.
3. Recent federal government funding cutbacks to NSERC have meant that undergraduate internship programs will be terminated in 2011, although undergraduate student research awards and the Aboriginal Ambassador in the Natural Sciences and Engineering Supplement Program remain intact.
4. In the United States, the National Science Foundation provides several research training programs for undergraduate students, such as Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences, Developing Global Scientists and Engineers (International Research Experiences for Students), and Research in Undergraduate Institutions (http://www.nsf.gov/funding/education.jsp?fund_type=1). Furthermore, in partnership with the Recovery Act, the National Institutes of Health is providing summer research opportunities for both high school and undergraduate students (http://grants.nih.gov/grants/guide/notice-files/not-od-09-060.html).
LITERATURE CITED


Faculty Perceptions of Research, Scholarly, and Creative Activity and Grant Seeking at a Predominantly Undergraduate Institution

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ABSTRACT

The authors conducted a brief survey of tenured and tenure-track faculty at Loyola Marymount University (LMU) to explore faculty attitudes toward Research, Scholarly and Creative Activity (RSCA) and the pursuit of external funding, as well as their perceptions of services offered by the Office for Research and Sponsored Projects (ORSP). Results showed that faculty members’ sense of the importance of RSCA was not necessarily associated with grant seeking. Results of a MANOVA and subsequent univariate ANOVAs demonstrated that while science faculty were more likely to see grant seeking as important to the tenure process, liberal arts faculty were more likely to value RSCA as an enhancement of teaching. Multiple regression analyses identified behaviors that predict high faculty satisfaction with office services and willingness to recommend the LMU ORSP to faculty colleagues.
INTRODUCTION

Sponsored projects offices at institutions of higher education are responsible for encouraging and assisting faculty as they work to acquire grant funding for research, scholarly and creative activity (RSCA). External funding can allow faculty to pursue more extensive research projects because it can bring faculty release time, equipment, travel funds, and professional assistance (for example, data analysis, or program management). Grant funding can also enhance the institution by contributing to indirect or facilities and administrative costs (F&A), bringing a new income stream into the institution (Cole, 2007). Predominantly undergraduate institutions (PUIs) are the teaching engines of U.S. higher education. By its very nature, the sponsored projects office in the predominantly undergraduate environment represents an on-the-ground institutional commitment to research through pre-proposal assistance, and tends to build closer and more collaborative relationships with faculty than similar offices in research universities (Pogatschnik, 2008). Lowry and Hansen (2001) suggested that the role of sponsored projects offices at PUIs should encompass the institutional integration of research and teaching, a proposition fraught with policy issues, historical biases, and personnel considerations:

Whether by conscious intent or by acquiescence to an imitative model inherited from doctoral institutions, research administration offices perpetuate old divisions between teaching and research. The end result is that we contribute to conflict and mixed signals both within the university and with agencies external to it (Lowry & Hansen, 2001, p. 12).

These offices at PUIs sometimes increase tension among faculty by increasing the institutional resources allocated to research administration activities (pre-award activities, accounting, compliance, etc.), and therefore away from teaching activities. Another source of tension can emerge because externally funded research may not be critical to processes of tenure and promotion at PUIs. It is beyond the scope of this study to suggest the proper purview of sponsored projects offices at all PUIs, except to note that each office might serve best by becoming aware of the interests and needs of its own faculty and addressing them. Many sponsored projects offices attempt to do this by conducting faculty surveys.

Boyer and Cockriel (1998) conducted a survey of College of Education faculty at Association of American Universities (AAU) Research I institutions to explore barriers and motivating factors in grant seeking. Results reflected the nature of these research institutions: the greatest motivations included promotion and tenure, the building of professional reputation, and the commitment of the institution’s president to grant seeking. Barriers included lack of training in the grants process, lack of understanding of budgeting, and unfamiliarity with funding sources. These results from research universities differ from the most cited common barrier for PUIs: the lack of time.

In their 2008 study of perceptions of female associate professors toward the barriers to and supports of grant writing at Boise State University, Idaho State University, and the University of Idaho, Easterly and Pemberton (2008) found that top institutional barriers included a heavy teaching load, heavy committee assignments, or a lack of key resources, including: knowledge of funding sources, peer networks, and travel funds to attend conferences. Personal barriers included perceived lack of training and lack of mentors. Respondents felt that their institutions strongly supported their efforts; however, they were not always aware of the services provided by the grants office. Based on their data, Easterly and Pemberton pointed out that although strong support may exist at an institution, faculty must know about services in order to use them.
In 1995, Dooley investigated a shift in institutional culture toward increased grant-funded research at the College of Education at Texas A&M. Texas A&M is a research-intensive university; however, up until the period studied, the College of Education had emphasized teaching, and so processes examined by Dooley are similar to those of PUIs. Dooley identified barriers and incentives to grant writing, and found that a primary consideration of Texas A&M College of Education faculty was acquiring sufficient time to prepare the proposal and conduct the award. Barriers included heavy teaching and advising loads, as well as receiving relevant information too late to prepare a competitive proposal. The top services provided by the local grants office included information on how to create a budget, search for opportunities, and prepare the necessary documents for administrative approval of the submission.

Sterner (1999) conducted a survey of tenured and tenure-track faculty at Bradley University, a PUI, to measure attitudes toward RSCA and teaching. She found that while faculty emphasize teaching over research, they also strongly value the effect of RSCA on their professional development, on the quality of instruction and on excellence in teaching. Faculty at Bradley believe that external funding activities are considered in the tenure and promotion process.

The Office of Sponsored Programs at California State University at Chico conducts regular assessments of faculty needs (LeBlanc, Jackson, & Wright, 2003). In 2001–2002, the assessment concentrated on perception of the teacher-scholar model in an institution that has seen great change from a strong teaching mission to growing emphasis on scholarship. The authors found that deans, department chairs, and new tenure-track faculty agree on a conceptual level that colleges and departments encourage faculty to seek external funding to pursue RSCA and that the pursuit of external funding contributes to professional growth, and tenure and promotion. Results on grant-seeking behaviors were different, however:

University leadership also espouses the benefits of the teacher-scholar model. But the majority of department chairs—the gatekeepers of the retention, tenure and promotion process and, typically, members of the senior faculty—disagree over the significance of seeking and obtaining external funding as well as whether it is legitimate to equate the pursuit of external funding with doing research (LeBlanc, Jackson, & Wright, 2003, p. 28).

**BACKGROUND**

Loyola Marymount University (LMU) is a PUI and four-year, private, comprehensive Master’s I, Catholic institution sponsored by the Society of Jesus (Jesuits) and the Religious of the Sacred Heart of Mary. LMU was established in Los Angeles, California in 1911, and had a 2008 enrollment of 5,667 undergraduates and 3,205 graduate students, including the students of Loyola Law School. The student-to-faculty ratio is 11:1.

LMU faculty have historically shared a fundamental interest in pedagogy, as reflected in the mission, goals, and objectives of the institution, and throughout the *Faculty Handbook* where teaching is always listed before scholarship. The *Handbook* sets teaching and advising as the first Specific Faculty Responsibility:

Excellent teaching is central to the University’s mission and rooted in the traditions of the founding religious orders. The faculty member plays a vital role in carrying out the
mission of the University by challenging and encouraging students to become life-long learners (Loyola Marymount University, 2009, p. I-22).

In recent years, LMU has increasingly emphasized the importance of faculty engagement in externally funded research projects by increasing support services through the development of the administrative lattice, as Massy might put it (Massy, 2003). In 2007, a Vice President for Research was hired, and the Office for Research and Sponsored Projects (ORSP), a primarily pre-awards office, was augmented by the hiring of two additional positions: an Executive Director for Research and Compliance and an additional pre-award administrator. This increase in resources devoted to research has resulted in a near tripling of awards, from $2.3 million in 2004 to $6.5 million in 2009.

PURPOSE

The development of this research infrastructure has been welcomed by most faculty at LMU. Nevertheless, ORSP staff is cognizant of the fact that an increased emphasis on research may occasion tensions regarding the tenure process, as well as faculty responsibilities as instructors and scholars. Three themes recurred:

1) Some faculty felt that external funding might not be important to faculty careers.
2) Others thought that the pursuit of external funding did not seem to be recognized in the tenure process.
3) Another group of faculty wondered whether there was assistance on campus for the pursuit of external funding.

ORSP staff were interested in knowing more about the prevalence of these views, and, if necessary, how the institution should address them. Therefore, in 2009 two of the authors, members of the ORSP staff, conducted a survey self-report to measure faculty perceptions of: (1) the relationship of RSCA to the pursuit of external funding; (2) the importance of the pursuit of external funding to the tenure process and career development; and (3) the perceptions of faculty regarding ORSP outreach and service.

METHODOLOGY

The authors began preparing the survey instrument in summer 2008, and guided it through several iterations and a pilot study. RSCA questions were based in part on the Sterner (1999) study of faculty attitudes toward external grant seeking. Other questions were developed based on ORSP management experience, and in conjunction with faculty, administrators, the Director for Institutional Assessment, and the LMU Research Council over a six-month period of preparation. IRB approval was granted in 2008. Administration of the survey was delayed twice due to institutional concerns about faculty survey fatigue, and it was finally deployed in fall 2009.

The final survey consisted of 24 items, including four demographic questions, five questions on RSCA and tenure, four questions on the effectiveness of ORSP outreach, and seven questions on the effectiveness of ORSP service.
Quantitative data were gathered using a 5-point Likert scale: (1) Strongly Agree, (2) Agree, (3) I don’t know, (4) Disagree, and (5) Strongly Disagree. “I don’t know” was included to offer a neutral response or to indicate lack of knowledge.

For purposes of survey distribution, LMU tenured and tenure-track faculty members were divided into two groups. The first included those who had worked with the ORSP to submit a grant proposal at least once during the previous 27 months (July 15, 2007–November 1, 2009), a total of 140. This group will be referred to as the “client” group. The Vice President of Research and Dean of Graduate Programs emailed an invitation to this group that included a link to the survey, housed on Survey Monkey: www.surveymonkey.com. They received two reminders in one-week increments.

The second group consisted of 100 faculty members selected randomly from the remaining group of 265 tenured and tenure-track faculty members, provided by the Office of Institutional Research. This group will be referred to as the “nonclient” group. One week after the invitation was sent to the first group, the second group was similarly invited by email to participate, provided with a separate link to the same survey housed on Survey Monkey, and reminded twice, in one-week increments. The two links to the survey were each kept live for four weeks and then the survey was closed.

**RESULTS**

Most academics believe that research begets good teaching and that good teaching begets educational quality (Massy, 2003, p. 87)

Of the 240 faculty members approached, 136 tenured and tenure-track faculty members responded, 87 clients, or 60.8%, and 49 nonclients, or 33%—altogether, a 56.7% return. Three nontenure-track ORSP client faculty also responded and are included in the results. Sixty-three percent of respondents were male, and 38% were female. Fifty-nine participants (42.4%) were from the College of Liberal Arts, and 40 (28.8%) were from the College of Science and Engineering, with the rest distributed at between 4% and 9% among the School of Film and Television, the School of Education, the College of Communication and Fine Arts, and the College of Business Administration. Loyola Law School professors were not approached for this survey.

**Research, Scholarly and Creative Activity at LMU**

In keeping with presumed faculty interest in the ties between teaching and RSCA at LMU, the survey responses to Questions 5a, 5b, and 5c, adapted from Sterner (1999), reflect these concerns. Given LMU’s strong mission-centered impetus toward teaching and the drive toward research that currently permeates higher education, LMU faculty seem amenable to the kind of teaching-research fusion espoused by such thinkers as Boyer in *Scholarship Reconsidered* (Boyer, 1990). Table 1 shows survey respondents had high rates of agreement with statements that reflect the value of RSCA to the quality of instruction (91%), excellence in teaching (77.4%), and remaining current in their disciplines (97.8%). One might expect that ORSP client faculty, who had applied for grants sometime during the two years preceding this study, would express more agreement with the positive aspects of RSCA. When disaggregated into client and nonclient groups (Table 2), however, there was somewhat less agreement on the value of RSCA relative to excellence in...
teaching (form or pedagogy) or the quality of instruction (content). Responses by nonclient faculty reflected higher rates of agreement with the connection between RSCA and quality of instruction and excellence in teaching than client faculty.

These data suggest that the perception of respondents on the importance of RSCA for teaching and instruction does not necessarily indicate that the pursuit of external funding for research at LMU is a highly valued activity. Most faculty at LMU see the importance of RSCA as it reflects on their daily teaching duties, and all see it as important to remaining conversant with trends in their disciplines; however, this does not necessarily result in grant-seeking behavior. Faculty members’ positive valuation of grant seeking, coupled with a relatively low grant proposal preparation behavior (34.5%), may be caused by time considerations—a primary barrier to grant seeking at PUIs, according to the literature. Another possible factor is that not all RSCA is easily funded by external sources, such as the scholarly activities of liberal arts faculty—however, this hypothesis calls for further study.

Table 1. Total Number of All Responses to Survey Questions 5a, 5b, and 5c. Frequencies of Importance Ratings of RSCA to Aspects of Teaching

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>I Don’t Know</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>5a. RSCA contributes toward quality of instruction.</td>
<td>86 (64.7%)</td>
<td>35 (26.3%)</td>
<td>7 (5.3%)</td>
<td>4 (3%)</td>
<td>1 (.8%)</td>
</tr>
<tr>
<td></td>
<td>91% Agreement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5b. RSCA helps faculty members attain excellence in teaching.</td>
<td>64 (48.1%)</td>
<td>39 (29.3%)</td>
<td>15 (11.3%)</td>
<td>14 (10.5%)</td>
<td>1 (.8%)</td>
</tr>
<tr>
<td></td>
<td>77.4% Agreement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5c. RSCA helps faculty members remain current in their disciplines.</td>
<td>100 (75.8%)</td>
<td>19 (22%)</td>
<td>3 (2.3%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>97.8% Agreement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Comparison of Number of Strongly Agree and Agree Responses to Survey Questions 5a, 5b, and 5c by ORSP Clients’ and Nonclients’ Agreement Rates on the Nature of RSCA

<table>
<thead>
<tr>
<th></th>
<th>ORSP Client Faculty</th>
<th>ORSP Nonclient Faculty</th>
<th>Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>5a. RSCA contributes toward quality of instruction.</td>
<td>73 (87.9%)</td>
<td>41 (95.3%)</td>
<td>121 (91%)</td>
</tr>
<tr>
<td>5b. RSCA helps faculty members attain excellence in teaching.</td>
<td>61 (73.5%)</td>
<td>36 (83.7%)</td>
<td>103 (77.4%)</td>
</tr>
<tr>
<td>5c. RSCA helps faculty members remain current in their disciplines.</td>
<td>82 (100%)</td>
<td>43 (100%)</td>
<td>119 (97.8%)</td>
</tr>
</tbody>
</table>
Pursuing Grants at LMU

Most survey respondents (79.4%) reported that tenure expectations are clearly articulated, as shown in Table 3. A small percent reported that they either did not know whether tenure expectations were clearly articulated (5.3%), or disagreed with the statement (15.3%). Despite this indication that they understand tenure expectations, only 53.4% of respondents strongly agreed or agreed that the pursuit of externally-funded projects is recognized in the tenure process (Table 4); about 13% of respondents expressed uncertainty (I Don’t Know). ORSP client faculty were more likely to report that the pursuit of grants is recognized in the tenure process (57.9%) than nonclient faculty (51.1%). Further, ORSP nonclients were much more likely than ORSP client faculty (39.5% versus 28.9%) to disagree with this statement, perceiving that the pursuit of external funding is not recognized in the tenure process.

Table 5 demonstrates that LMU ORSP clients are much more likely to consider grant writing important to their career advancement and professional growth than nonclients (69.3% versus 46.5%), and this may be an important motivating factor. Nearly as many nonclients (41.9%) reported that writing grants is not important to them in terms of career advancement and professional growth.

Table 3. Comparison of All Responses to Survey Question 6 by ORSP Clients and Nonclients.

<table>
<thead>
<tr>
<th>Question 6: Tenure expectations are clearly articulated to faculty in my department.</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>I Don’t Know</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORSP Clients</td>
<td>27 (32.9%)</td>
<td>38 (46.3%)</td>
<td>4 (4.9%)</td>
<td>9 (11%)</td>
<td>4 (4.9%)</td>
</tr>
<tr>
<td></td>
<td>79.2% Agreement</td>
<td></td>
<td></td>
<td></td>
<td>15.9% Disagreement</td>
</tr>
<tr>
<td>ORSP Nonclients</td>
<td>17 (40.5%)</td>
<td>19 (45.2%)</td>
<td>1 (2.4%)</td>
<td>4 (9.5%)</td>
<td>1 (2.4%)</td>
</tr>
<tr>
<td></td>
<td>85.7% Agreement</td>
<td></td>
<td></td>
<td></td>
<td>11.9% Disagreement</td>
</tr>
<tr>
<td>Total Population</td>
<td>44 (33.6%)</td>
<td>60 (45.8%)</td>
<td>7 (5.3%)</td>
<td>15 (11.5%)</td>
<td>5 (3.8%)</td>
</tr>
<tr>
<td></td>
<td>79.4% Agreement</td>
<td></td>
<td></td>
<td></td>
<td>15.3% Disagreement</td>
</tr>
</tbody>
</table>

Table 4. Comparison of All Responses to Survey Question 7 by ORSP Clients and Nonclients.

<table>
<thead>
<tr>
<th>Question 7: In my opinion, the pursuit of external funding for research, scholarly and creative activity is recognized in the tenure process in my department.</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>I Don’t Know</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORSP Clients</td>
<td>15 (8.8%)</td>
<td>30 (37.5%)</td>
<td>11 (13.8%)</td>
<td>22 (27.5%)</td>
<td>2 (2.5%)</td>
</tr>
<tr>
<td></td>
<td>56.3% Agreement</td>
<td></td>
<td></td>
<td></td>
<td>30% Disagreement</td>
</tr>
<tr>
<td>ORSP Nonclients</td>
<td>7 (16.3%)</td>
<td>15 (34.9%)</td>
<td>5 (11.6%)</td>
<td>12 (27.9%)</td>
<td>4 (9.3%)</td>
</tr>
<tr>
<td></td>
<td>51.1% Agreement</td>
<td></td>
<td></td>
<td></td>
<td>39.5% Disagreement</td>
</tr>
<tr>
<td>Total Population</td>
<td>23 (17.3%)</td>
<td>48 (36.1%)</td>
<td>18 (13.5%)</td>
<td>35 (26.3%)</td>
<td>9 (6.8%)</td>
</tr>
<tr>
<td></td>
<td>53.4% Agreement</td>
<td></td>
<td></td>
<td></td>
<td>33.1% Disagreement</td>
</tr>
</tbody>
</table>
Table 5. Comparison of All Responses to Survey Question 8 by ORSP Clients and Nonclients.
Question 8: Writing grants is important to me in terms of career advancement and professional growth.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>I Don’t Know</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORSP Clients</td>
<td>28 (31.3%)</td>
<td>33 (37.5%)</td>
<td>7 (8%)</td>
<td>15 (17%)</td>
<td>5 (5.7%)</td>
</tr>
<tr>
<td></td>
<td>69.3% Agreement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORSP Nonclients</td>
<td>10 (23.3%)</td>
<td>10 (23.3%)</td>
<td>5 (11.6%)</td>
<td>13 (30.2%)</td>
<td>5 (11.6%)</td>
</tr>
<tr>
<td></td>
<td>46.5% Agreement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Population</td>
<td>38 (29%)</td>
<td>43 (32.8%)</td>
<td>12 (9.2%)</td>
<td>28 (21.4%)</td>
<td>10 (7.6%)</td>
</tr>
<tr>
<td></td>
<td>61.8% Agreement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ORSP Outreach and Services

As members of a service-oriented office, LMU ORSP staff are extremely interested in feedback on performance. Consequently, survey questions in this section were chosen with great care (Table 6). Questions were based on: samples uncovered during our literature review (Question 11, source of grants assistance); recent changes to ORSP services (Question 12, updated website); and current ORSP service standards (Question 15, clear submission procedures, and Question 16, validation of assistance). Questions 14, 19, and 20 represent variations intended to ascertain satisfaction with services overall. Results from Question 11 indicate that general outreach efforts, which were expanded in 2008, have been successful, with 90% of faculty indicating they know to call ORSP regarding their grant and contract projects. This result is very positive given Easterly and Pemberton’s (2008) conclusion about the importance of faculty awareness of services. The LMU ORSP website (Question 12), which was recently revised (2008) to present a wide range of materials to assist with proposal development, was relatively unknown, with 38.2% of faculty agreeing that the website is helpful, and 44.3% of faculty unfamiliar with it.

Questions 14–20 brought generally good marks for the office, with a decisive majority of faculty reporting that they had excellent experiences working with the ORSP (69.9%), that submission procedures are clear (61.7%), that questions are answered (79.4%) that the staff is helpful in the submission process (72.8%), that they are treated with courtesy (90.3%), that they look forward to working with the office again (66.3%), and that they would recommend the ORSP to colleagues (72.6%).

All in all, there was satisfaction with these results, as well as suggestions for improvement.
Table 6. Comparison of All Responses to Questions 11–20 Describing Knowledge and Attitudes of ORSP Clients to ORSP Services

<table>
<thead>
<tr>
<th>Question</th>
<th>Agree*</th>
<th>I Don’t Know</th>
<th>Disagree**</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. If I had an idea for a grant proposal that I would like to submit to a federal or state agency, foundation, corporation, or professional or scholarly association, I would know what office to call on campus for help. (Includes nonclient responses.)</td>
<td>90%</td>
<td>3.8%</td>
<td>6.2%</td>
</tr>
<tr>
<td>12. The website of the Office for Research and Sponsored Projects is very helpful. (Includes nonclient responses.)</td>
<td>38.2%</td>
<td>44.3%</td>
<td>17.5%</td>
</tr>
<tr>
<td>14. I had an excellent experience working with the Office for Research and Sponsored Projects (or Academic Grants Office).</td>
<td>69.9%</td>
<td>8.6%</td>
<td>21.5%</td>
</tr>
<tr>
<td>15. The procedures for submitting a grant proposal were clear to me.</td>
<td>61.7%</td>
<td>13.2%</td>
<td>19.8%</td>
</tr>
<tr>
<td>16. The staff member(s) I worked with made sure my questions were answered.</td>
<td>79.4%</td>
<td>5.4%</td>
<td>15.3%</td>
</tr>
<tr>
<td>17. The staff member(s) I worked with was/were helpful in the grant preparation process.</td>
<td>72.8%</td>
<td>10.9%</td>
<td>16.3%</td>
</tr>
<tr>
<td>18. The staff member(s) I worked with exhibited professional courtesy.</td>
<td>90.3%</td>
<td>4.3%</td>
<td>5.4%</td>
</tr>
<tr>
<td>19. I look forward to working with the ORSP again on other projects.</td>
<td>66.3%</td>
<td>17.4%</td>
<td>16.3%</td>
</tr>
<tr>
<td>20. I would recommend the LMU ORSP to other faculty members for assistance with a grant.</td>
<td>72.6%</td>
<td>13.2%</td>
<td>14.3%</td>
</tr>
</tbody>
</table>

*Aggregated Agree and Strongly Agree  **Aggregated Disagree and Strongly Disagree

**STATISTICAL ANALYSIS**

A MANOVA was performed to examine differences between the colleges and schools on level of agreement ratings concerning the following questions:

5b. RSCA helps University faculty members attain excellence in teaching.
6. Tenure expectations are clearly articulated to faculty in my department.
7. In my opinion, the pursuit of external funding for RSCA is recognized in the tenure process in my department.
8. Writing grants is important to me in terms of career advancement and professional growth.
16. The staff member(s) I worked with made sure my questions were answered.
17. The staff member(s) I worked with was/were helpful in the grant preparation process.
20. I would recommend the LMU ORSP to other faculty members for assistance with a grant.

The homogeneity of variance assumption was not met for several of these dependent variables (Levene’s test, \( p < .05 \) for all). A natural log transformation was performed on each of the seven
dependent variables and the assumption was satisfied for each of the variables \((p > .25\) for all). Faculty at different colleges and schools in the University were compared on level of agreement ratings regarding the dependent variables, including faculty at the College of Liberal Arts \((n = 34)\), the College of Science and Engineering \((n = 31)\), and other colleges and schools \((n = 20; N = 85)\). Using Pillai’s trace, there was a significant overall multivariate test \(V = 0.60, F(14, 154) = 4.68, p < .001, \text{partial } \eta^2 = .30\). This finding indicates a significant effect of college and school on level of agreement ratings regarding the dependent variables.

Subsequent univariate ANOVAs revealed a significant effect of college/school on level of agreement ratings concerning three of the dependent variables:

5b. **RSCA helps University faculty members attain excellence in teaching**, \(F(2, 82) = 5.27, p < .01, \text{partial } \eta^2 = .11\);

6. **Tenure expectations are clearly articulated to faculty in my department**, \(F(2, 82) = 12.97, p < .001, \text{partial } \eta^2 = .24\);

7. **In my opinion, the pursuit of external funding for RSCA is recognized in the tenure process in my department**, \(F(2, 82) = 9.32, p < .001, \text{partial } \eta^2 = .19\).

Univariate ANOVAs regarding the remaining dependent variables were not significant \((p > .10\) for all).

Further analyses were conducted to understand the significant findings. For level of agreement ratings concerning 6. **Tenure expectations are clearly articulated to faculty in my department** dependent variable, post hoc Bonferroni comparisons of means indicated that faculty in the College of Liberal Arts \((M = 1.79, \text{SE} = 0.16)\) and the College of Science and Engineering \((M = 1.74, \text{SE} = 0.17)\) each demonstrated a significantly higher level of agreement than faculty in other colleges and schools at LMU \((M = 3.15, \text{SE} = 0.21; p < .001\) for all). Faculty in the College of Liberal Arts and the College of Science and Engineering did not significantly differ in their level of agreement ratings on this variable \((p > .05\).

For level of agreement ratings regarding 5b. **RSCA helps University faculty members attain excellence in teaching** dependent variable, faculty in the College of Liberal Arts \((M = 1.50, \text{SE} = 0.18)\) demonstrated a significantly higher level of agreement than faculty in the College of Science and Engineering \((M = 2.23, \text{SE} = 0.18; p < .01\). Faculty in neither of these colleges significantly differed in their level of agreement ratings on this variable compared to faculty in other colleges and schools in the University \((M = 1.80, \text{SE} = 0.23; p > .05\) for all).

For level of agreement ratings concerning 7. **In my opinion, the pursuit of external funding for RSCA is recognized in the tenure process in my department**, the dependent variable—faculty in the College of Science and Engineering \((M = 1.84, \text{SE} = 0.19)\)—demonstrated a significantly higher level of agreement than faculty in the College of Liberal Arts \((M = 2.91, \text{SE} = 0.18; p < .001\) and faculty in other colleges and schools at LMU \((M = 2.85, \text{SE} = 0.24; p < .01\). Faculty in the College of Liberal Arts did not significantly differ in their level of agreement ratings on this variable compared to faculty in other colleges and schools in the University \((p > .05\).

Two multiple regression analyses were performed to investigate the relationship between faculty satisfaction in working with the ORSP and particular ORSP staff services. The first analysis measured faculty satisfaction according to level of agreement ratings regarding 14. **I had an excellent experience working with the ORSP**. The second analysis measured faculty satisfaction
according to level of agreement ratings concerning 20. I would recommend the LMU ORSP to other faculty members for assistance with a grant. For both analyses, level of agreement ratings regarding particular ORSP staff services served as the set of predictor variables, and included:

11. If I had an idea for a grant proposal that I would like to submit to a federal or state agency, foundation, corporation, or professional or scholarly association, I would know what office to call on campus for help;
12. The website of the ORSP is very helpful;
15. The procedures for submitting a grant proposal were clear to me;
16. The staff member(s) I worked with made sure my questions were answered;
17. The staff member(s) I worked with was/were helpful in the grant preparation process; and
18. The staff member(s) I worked with exhibited professional courtesy.

The first analysis regressed level of agreement ratings concerning 14. I had an excellent experience working with the ORSP on the six office services. The test of the overall model suggests a significant relationship between level of agreement ratings regarding 14. I had an excellent experience working with the ORSP and office services ($F(6, 81) = 56.80, p < .001$). The multiple correlation was .90, indicating that approximately 81% of the variance in level of agreement ratings concerning 14. I had an excellent experience working with the ORSP was accounted for by the linear combination of predictor variables. Regarding each of the predictor variables, level of agreement ratings concerning 17. The staff member(s) I worked with was/were helpful in the grant preparation process and 15. The procedures for submitting a grant proposal were clear to me were strong predictors of level of agreement ratings concerning 14. I had an excellent experience working with the ORSP. Level of agreement ratings regarding 16. The staff member(s) I worked with made sure my questions were answered was a moderate predictor. Each of the remaining predictor variables was a poor predictor. Table 7 presents the results of the first regression analysis.

The second analysis regressed level of agreement ratings concerning 20. I would recommend the LMU ORSP to other faculty members for assistance with a grant on the same six ORSP staff services. The test of the overall model suggests a significant relationship between level of agreement ratings regarding 20. I would recommend the LMU ORSP to other faculty members for assistance with a grant and office services ($F(6, 81) = 41.28, p < .001$). The multiple correlation was .87, indicating that approximately 75% of the variance in level of agreement ratings concerning 20. I would recommend the LMU ORSP to other faculty members for assistance with a grant was accounted for by the linear combination of predictor variables. With regard to each of the predictor variables, level of agreement ratings concerning 17. The staff member(s) I worked with was/were helpful in the grant preparation process and 16. The staff member(s) I worked with made sure my questions were answered were strong predictors of level of agreement ratings concerning 20. I would recommend the LMU ORSP to other faculty members for assistance with a grant. Each of the remaining predictor variables was a poor predictor. Table 8 presents the results of the second regression analysis.

According to collinearity statistics, multicollinearity was not a problem in the regression analyses since values for the VIF were not excessive.17
Table 7. Regression of Level of Agreement Ratings Concerning Faculty Having an Excellent Experience Working with the ORSP on the Six ORSP Staff Services: Regression Coefficients

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.28</td>
<td>0.22</td>
<td></td>
</tr>
<tr>
<td>11. If I had an idea for a grant proposal that I would like to submit to a federal or state agency, foundation, corporation, or professional or scholarly association, I would know what office to call on campus for help.</td>
<td>0.00</td>
<td>0.09</td>
<td>0.00</td>
</tr>
<tr>
<td>12. The website of the Office for Research and Sponsored Projects is very helpful.</td>
<td>0.06</td>
<td>0.09</td>
<td>0.04</td>
</tr>
<tr>
<td>16. The staff member(s) I worked with made sure my questions were answered.</td>
<td>0.28*</td>
<td>0.10</td>
<td>0.25</td>
</tr>
<tr>
<td>17. The staff member(s) I worked with was/were helpful in the grant preparation process.</td>
<td>0.40**</td>
<td>0.10</td>
<td>0.37</td>
</tr>
<tr>
<td>18. The staff member(s) I worked with exhibited professional courtesy.</td>
<td>-0.01</td>
<td>0.10</td>
<td>-0.01</td>
</tr>
<tr>
<td>15. The procedures for submitting a grant proposal were clear to me.</td>
<td>0.42**</td>
<td>0.09</td>
<td>0.36</td>
</tr>
</tbody>
</table>

Notes. N = 88; R = .90; R² = .81; Adj. R² = .79; *p < .01; **p < .001.
Table 8. Regression of Level of Agreement Ratings Concerning Faculty Recommending the ORSP on the Six ORSP Staff Services: Regression Coefficients

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.48†</td>
<td>0.24</td>
<td></td>
</tr>
<tr>
<td>11. If I had an idea for a grant proposal that I would like to submit to a federal or state agency, foundation, corporation, or professional or scholarly association, I would know what office to call on campus for help.</td>
<td>0.13</td>
<td>0.09</td>
<td>.08</td>
</tr>
<tr>
<td>12. The website of the Office for Research and Sponsored Projects is very helpful.</td>
<td>0.15</td>
<td>0.09</td>
<td>.11</td>
</tr>
<tr>
<td>16. The staff member(s) I worked with made sure my questions were answered.</td>
<td>0.34*</td>
<td>0.11</td>
<td>.31</td>
</tr>
<tr>
<td>17. The staff member(s) I worked with was/were helpful in the grant preparation process.</td>
<td>0.37*</td>
<td>0.11</td>
<td>.35</td>
</tr>
<tr>
<td>18. The staff member(s) I worked with exhibited professional courtesy.</td>
<td>0.13</td>
<td>0.11</td>
<td>.10</td>
</tr>
<tr>
<td>15. The procedures for submitting a grant proposal were clear to me.</td>
<td>0.12</td>
<td>0.10</td>
<td>.11</td>
</tr>
</tbody>
</table>

Notes. N = 88; R = .87; R² = .75; Adj. R² = .74; *p < .052; **p < .01.

**DISCUSSION**

The survey responses provide insights into the three areas of concern expressed by LMU faculty that provided the purpose for this study, as well as the pursuit of external funding for RSCA and its relevance to the teaching mission of LMU. The insights are not always those that might have been anticipated by faculty conversations, however.

1) Some faculty felt that external funding might not be important to faculty careers.

In fact, RSCA and external funding were reported as very important to many faculty careers. Findings indicate that rates of LMU faculty agreement with statements regarding the importance of RSCA to teaching and keeping current in their disciplines are strong. Surprisingly, compared to ORSP client faculty, nonclient faculty were more likely to impute importance to RSCA for quality of instruction (95.3% vs. 87.9%) and to excellence in teaching (83.7% vs. 73.5%). Faculty recognition of the importance of RSCA to teaching, therefore, does not necessarily translate into increased production of proposals for external funding. This may be an important result for those interested in increasing proposal production at PUIs, especially in consideration of well-documented findings that for most faculty teaching and research are mutually exclusive activities.
(Fairweather, 2005). Faculty who report grant seeking important to their careers are more likely to engage in grant seeking behaviors as clients of the ORSP.

2) Other faculty thought that the pursuit of external funding did not seem to be recognized in the tenure process.

In fact, most faculty perceive that the pursuit of external funding is recognized in the tenure process.

A majority of the faculty respondents (79.4%) felt that tenure expectations were articulated clearly, and ORSP client faculty were more likely than ORSP nonclients to consider the pursuit of external funding as important to the tenure process in their departments (57.9% vs. 51.5%). Nonclient faculty perceived that the pursuit of grant funding was not recognized at a much higher rate than ORSP client faculty (39.5% vs. 28.9%). ORSP clients were far more likely to report that grant seeking is important in terms of career development and professional growth (69.3% vs. 46.5%). This result suggests that tenure expectations may have an impact on whether faculty pursue external funding—another element of interest to those who seek to increase faculty grant-seeking at PUIs.

The College for Science and Engineering faculty respondents demonstrated significantly higher levels of agreement concerning 7. In my opinion, the pursuit of external funding for RSCA is recognized in the tenure process in my department, more than their colleagues from the College for Liberal Arts and faculty at other schools and colleges at LMU. This result corroborates the importance of the pursuit of grant funding in the sciences generally as scientific investigations tend to require resources and equipment which cannot be easily supplied by most universities. It is to be expected that acquiring external grant funding to support scientific investigations will often be important to completing research that leads to publications and this can lead to tenure and career advancement.

On the other hand, results show that faculty from the College of Liberal Arts are more likely to agree with 5b. RSCA helps University faculty members attain excellence in teaching. It is unclear whether this is due to more awareness of the development of the RSCA-teaching paradigm among liberal arts faculty generally (i.e., the Teacher-Scholar model), or whether the physical arrangement of the campus may have an impact. The LMU Center for Teaching Excellence, a strong proponent of the RSCA-teaching paradigm, is located in the same building as the College of Liberal Arts.

3) Another group of faculty wondered whether there was assistance on campus for the pursuit of external funding.

In fact, the majority of the faculty members who have worked with the ORSP are satisfied with the services provided.

Despite the rather high degree of satisfaction shown with LMU ORSP services, only three of the six services were predictive of faculty agreement with the statement, 14. I had an excellent experience working with the ORSP. The assistance ORSP staff provided in submission, in making submission procedures clear, and answering questions regarding submissions seemed to make the difference to ORSP clients in their assessment of the office. This finding supports Campbell’s (1998) observations that active helping behaviors encourage faculty to engage in the submission
of grant proposals. Despite the high rating faculty gave LMU ORSP staff for courtesy (90.3%), for example, this did not influence faculty satisfaction with the office. Further, to bring faculty members to the point of taking an active, positive step regarding the ORSP, that of recommending the office to a colleague, the predictors were more limited. Only 17. The staff member(s) I worked with was/were helpful in the grant preparation process and 16. The staff member(s) I worked with made sure my questions were answered were predictive of a recommendation. The high multiple correlation in each regression analysis was not surprising, as it is likely that faculty satisfaction working with the ORSP is mostly affected by the quality of ORSP staff services that were represented by the set of predictor variables in each analysis. A concern of this study was whether substantial differences existed among these services in influencing faculty satisfaction.

These preliminary results have clear ramifications for the service orientation of the LMU ORSP, and perhaps for PUIs generally: active helping behaviors—in this case, assisting in grant preparation and answering questions about submission—are the services that matter to grant-seeking faculty at LMU. Making submission procedures clear is also helpful. Other factors, including courtesy and a service-oriented website, do not make a difference in terms of positive faculty estimation of service. Naturally, courtesy should still be an important part of service standards; however, we predict that courtesy will only be reflected in faculty estimation of excellence and recommendation if it were to drop below a certain (unknown) threshold. These results suggest that the primary objective of ORSP services should be actively assisting faculty with grant submissions in order to best serve their needs. However, this is a pilot study. Further investigation is warranted.

**ACKNOWLEDGMENTS**

The authors are grateful to the following individuals for their assistance in conducting the project and in preparing the manuscript for publication: Joseph Hellige, Ph.D., Senior Vice President and Chief Academic Officer, LMU; John Carfora, Ed.D., Associate Vice President for Research Advancement and Compliance, LMU; Margaret Kasimatis, Ph.D., Vice President for Academic Planning and Effectiveness, LMU; Laura Massa, Ph.D., Director of Assessment, LMU; and the LMU Research Council, which provided valuable feedback on the instrument.

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